rachna program
2001-2006

women and child health at scale

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changing infant and child feeding behaviors

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Changing Infant and Child Feeding Behaviors

Abstract

Background and Interventions

Poor infant and young child feeding behaviors are known to be one of the most important causes of child malnutrition, which in turn is a major cause of child mortality. Early evidence from program areas established that inappropriate feeding practices and high incidence of childhood infections were major factors in malnutrition rates peaking before the age of two years. Thus, INHP-II aimed at helping the Integrated Child Development Services (ICDS) program, and to a lesser extent, the programs of the Health Department sharpen focus on efforts to target families with children less than two years of age to promote healthy feeding practices. The primary approach was to encourage timely advice at contacts and home visits by service providers and volunteers during the critical periods before and after six months of age, when support is maximally needed for exclusive breastfeeding and complementary feeding. These interactions emphasized the use of home-available foods for complementary feeding, and providing such cereal-based foods *ad libitum*, guided by an estimate of frequency and amount appropriate for age. Variety and nutrient density were also emphasized, within limits of the purchasing capacity of the family. Other approaches, including mass communication and the involvement of community groups in monitoring services were also employed, but less widely. All interventions were implemented at the full project scale of 78 districts across nine states. This paper describes the results and lessons from this experience.

Methods

Evidence is drawn mainly from state-level estimates of indicators from program baseline and endline surveys, district-level estimates from three rounds of periodic assessments from one district in each of the eight project states and from an evaluation research study conducted in one district to assess the impact of the INHP interventions on nutritional status, which included two intervention and two comparison districts. All estimates presented in the results pertain to INHP-assisted regions within the respective states and districts.

Results and Discussion

The largest changes seen in feeding behaviors were substantial improvements in the practice of early breastfeeding and the avoidance of prelacteals, seen across most states and districts over time. In about half the states and districts, improvements of more than 10 percentage points were seen in the practice of exclusive breastfeedin[illegible]mentary feeding, in feeding cereal-based complementa[illegible] the volumes of such foods fed to children. The[illegible]tary foods at the age of 6-9 months were equal o[illegible]ntemporary NFHS-3 estimates for correspondin[illegible]aluation research study, improvements in virtually all f[illegible]greater than those in the corresponding comparison c[illegible]ere was less remarkable difference from the comparis[illegible]

The availabil[illegible] not appear to have influenced the practice of c[illegible]etables and animal milk, a significant

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Background

The RACHNA program

The RACHNA program of CARE India included two USAID-supported projects: the second phase of Integrated Nutrition and Health Project (INHP-II), which focused on child health and nutrition, and the *Chayan* Project, which supported interventions for promoting birth spacing and the prevention of transmission of HIV/AIDS among groups at high risk. INHP-II, built upon the lessons and experiences of the first phase, was implemented in 747 Integrated Child Development Services (ICDS) blocks[1] in 78 districts across nine states[2] from October 2001 to December 2006 to complement the maternal and child health and nutrition (MCHN) efforts of the ICDS and the Ministry of Health and Family Welfare (MoHFW) programs. To achieve its goal of "sustainable improvements in the nutrition and health status of seven million women and children", INHP-II adopted a two-track approach – supporting service providers to improve the quality and coverage of MCHN services and systems and engaging communities to support better infant feeding and caring practices and sustain activities for improved maternal and child health and survival. The implementation was facilitated by small program teams of CARE, located at the district, state and national levels, and working closely with the functionaries of the ICDS program and the programs of the MoHFW, and with a range of partners, including local NGOs and Community-Based Organizations (CBOs). The main strategies were strengthening of existing systems, behavior change communication and capacity building. A detailed description of the program can be found in the paper, *Program Description*, in this series.

This paper describes the results and lessons from the RACHNA program related to Infant and Young Child Feeding.

Infant and Young Child Feeding

Malnutrition is responsible, directly or indirectly, for 60 percent of the 10.9 million deaths annually among children under five (WHO, 2003, Pelletier et al, 1993). It has close cyclical links with a number of common and dangerous childhood infections, which seriously impact the development of a growing child, even when not resulting in premature death. Malnutrition eventually directly impacts productivity and health in later life. Evidence indicates that addressing malnutrition through universal coverage of breastfeeding and appropriate complementary feeding can prevent up to 13 percent and six percent respectively, of all under-five deaths in high under-five mortality countries (Jones et al, 2003). This effect on mortality is in addition to the simultaneous direct effects of interventions to detect and manage diarrhea, ARI, malaria, HIV/AIDS and perinatal infections, assuming that these also reach near-universal scale. Until some of these more technologically challenging interventions reach universal scale, the effects on mortality of improved infant feeding, which can be practiced by families themselves, are likely to be even more pronounced than the above figures suggest.

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[1] A block is an administrative sub-unit of a district, having a population of around 100,000, and often larger. An ICDS block is usually identical to the administrative block, and comprises about 100 *Anganwadi* Centers (AWC). Not all blocks in a district and not all villages and hamlets within a block may be served by the ICDS program. INHP-II was designed to be implemented only in ICDS-served blocks, but did not necessarily cover all ICDS blocks in the districts where it was implemented.

[2] These include Andhra Pradesh (AP), Bihar (BI), Chhattisgarh (CG), Jharkhand (JH), Madhya Pradesh (MP), Orissa (OR), Rajasthan (RA), Uttar Pradesh (UP) and West Bengal (WB). Since the program was implemented in Bihar only from late 2004 onwards, results presented are only from the other eight states.

That malnutrition is caused by more than faulty feeding practices is universally recognized. In the context of poverty, the availability and access to quality nutrients in adequate amounts, access to a hygienic living environment, access to quality medical services and to correct information about healthy child care and feeding practices are frequently all severely limited, contributing to the high levels of malnutrition that are seen in many areas. Without directly addressing equitable economic development, malnutrition cannot be eliminated. However, evidence also strongly suggests (Scrimshaw 1995; Caulfield et al, 1999; Karim and Lamstein, 2003, Gragnolati M, 2005) that measurable improvements in nutritional status can be achieved even within existing poverty constraints, by influencing child feeding practices, with or without simultaneously addressing infections. The programs and intervention studies often used a mix of different forms of approaches to induce and maintain behavior change. As expected, there was variability in results, but the majority of the research and programmatic efforts improved growth rates by 0.1 to 0.5 SD (Caulfield et al, 1999; Penny et al, 2005). Results from the larger program settings provide plausible evidence that comprehensive, multifaceted interventions involving breastfeeding promotion and improved complementary feeding can be affordable and acceptable means to improve nutritional status of older infants. However, one has to be cautious in drawing conclusions from these program reports as most of these were not meant to have robust research designs.

Evidence from within India is more limited. Two recent, relatively small-scale studies in the states of Haryana and Karnataka demonstrated change but no clear improvement in weight-for-age status of infants as a result of nutrition counseling or education. In the rural Karnataka study, nutrition education and counseling was significantly associated with increased weight velocity among girls and improved feeding behaviors among both boys and girls (Kilaru et al, 2005). In rural Haryana, the main outcome measures were weights and lengths at 6, 9, 12, and 18 months and complementary feeding practices at 9 and 18 months. In the overall analyses, there was a small but significant effect on length gain in the intervention group. The effect was greater in the subgroup of male infants. Weight gain was not affected (Bhandari et al, 2004). Nutrition counseling by health workers and through other existing channels was found to be positively associated with exclusive breastfeeding prevalence at 3 months and consumption of milk/ cereal gruel or mix use at 9 months and 18 months (Bhandari et al, 2005).

Most of the available research on 30 years of ICDS does not provide convincing evidence that the program has made a difference to nutritional status or to feeding practices. This is reflected in the slow rates of improvements over successive rounds of the National Family and Health Surveys (NFHS) (Gupta et al, 2005). However, the World Bank evaluation of the Tamil Nadu Integrated Nutrition Program (TINP) indicated that improvements in feeding practices were achieved at scale, and may have led to improved nutritional status as well (World Bank, 1994).

The Role of INHP in Influencing Infant and Young Child Feeding

INHP-II was designed to help existing national programs and communities improve infant and young child feeding practices as part of an integrated set of interventions that also included strengthening community based newborn care,

primary immunization and provision of Vitamin A and Iron supplements. It was designed to reach a very large scale over a relatively short period of time. The initial design of the project addressed a wide range of issues in Infant and Young Child Feeding (IYCF) (Box 4.1), but compulsions of scale and time made it necessary to narrow the focus to a small set of basic and critical practices that were identified as the major gaps early in the life of the project. These included the promotion of:

- Early initiation of breastfeeding at birth and the avoidance of prelacteals
- Exclusive breastfeeding until six months of age
- Initiation of complementary feeding at six months
- Feeding of cereal-based semi-solid/solids following age-specific frequency and quantity recommendations
- Feeding of main meals by adults from separate plate/bowl
- Feeding a variety of home-available foods
- Increasing energy density by adding oil or ghee to meals.

Other aspects, particularly food hygiene and the management of feeding during and after illnesses did not receive similar levels of attention.

A number of different approaches were employed in INHP to influence change in feeding practices (Box 4.1). A later section in the paper describes how the program strategy evolved to reach scale with these interventions.

By design, the geographical reach of INHP-II interventions expanded in phases, only reaching the last 50 percent of the program universe in the last year of the program.

Methods of Assessment

Evidence used in this paper comes mainly from a number of large sample surveys conducted over the life of the program for monitoring and evaluation purposes. This section describes the methodology of these surveys in brief.

Baseline and Endline Surveys

Baseline and endline surveys of INHP-II provided state-level estimates for selected indicators. The endline survey of INHP-I (early 2001) served as the baseline survey of INHP-II. The INHP-I endline for Bihar served as the baseline for Jharkhand and the Madhya Pradesh endline served as the baseline for both Madhya Pradesh and Chhattisgarh, since the new states of Chhattisgarh and Jharkhand were created from a division of the erstwhile Madhya Pradesh and Bihar respectively, just prior to the INHP endline survey.

INHP-I consisted of three kinds of program areas based on intensity of interventions and effort: the "High impact" blocks, "Capacity building blocks" and "Other blocks". The 2001 survey was designed to generate separate estimates of these three areas through a multi-stage sampling design: a fixed number of blocks and PSUs (AWCs - *Anganwadi* Centers) were randomly picked from each of

Box 4.1: Key interventions and approaches for improving Infant and Young Child Feeding (IYCF)

Infant and child feeding practices promoted by INHP:

- Initiation of breastfeeding immediately after birth
- Avoidance of the feeding of prelacteals
- Exclusive breastfeeding until six months of age
- Initiation of complementary feeding at six months
- Age-appropriate frequency, quantities and consistency of cereal-based meals
- Responsive feeding of meals by responsible adults or older children
- Feeding out of a separate bowl or plate
- Nutrient density, including energy density
- Inclusion of a wide variety of food items in the diet to maximize nutrient variety
- Nutritional snacks between meals
- Appropriate feeding during and after illnesses
- Continued breastfeeding until 24 months of age.

Program approaches to promote IYCF:

- Behavior Change Communication
  - Interpersonal communication through home visits and other contacts by service providers and volunteers, using job aids to inform and to help solve problems, during critical contact periods from pregnancy up to two years of a child's age. Detailed guidance on how to operationalize the promotion of infant feeding practices at village, sector and block levels
  - Folk and mass media, including wall-slogans, posters, street-plays, radio spots, informed by formative research.
- Building capacities and skills
  - A wide range of target groups:
    Field functionaries of ICDS and Health department staff, especially AWW and ANM and their direct supervisors
    Volunteers (Change Agents)
    Community groups (SHG, Mahila Mandal, PRI members)
  - Facilitators included block and district level teams comprised contracted local NGOs, ICDS and Health department staff and external resource teams.
- Advocacy and use of evidence
  - Advocacy for expansion of ICDS operational focus from treatment of children with malnutrition to the prevention of malnutrition in all children, focusing on the under-two child
  - Advocacy for structured and supervised interpersonal communication efforts by AWW and ANM, including through home visits and other contacts
  - Independent assessments at district levels of processes, outputs and outcomes considered critical to achieving impact, and use of the evidence to highlight gaps and plan for action.

State and district level CARE/INHP teams facilitated and managed implementation of these approaches at all levels.

the three areas 540, 540 and 832 respondents (mothers of children 0-23 months old) were selected respectively using a predetermined random selection process. The interview tool was common to all children of 0-23 months, and covered all interventions supported by INHP – antenatal, natal and newborn care, infant feeding and immunization. State-level estimates, derived by applying population weights to the three areas, are used for all comparisons with the endline, without reference to the three kinds of program areas.

The endline survey of INHP-II (early 2006) used a multistage sampling design, but this differed in some respects from the baseline. The respondents (mothers of children 0-23 month old), were drawn from two groups. The mothers of children 0-5 months of age were asked questions related mainly to antenatal, natal and newborn care and breastfeeding, while mothers of children 6-23 months old were interviewed with questions mainly related to complementary feeding and immunization. This helped minimize recall bias and capture more recent events, likely to have been influenced by program interventions. The sample size was sufficient to detect a 10 percentage point difference in an estimate with 95 percent confidence limits and 80 percent power, and an assumed maximum design effect of 1.8. The number of PSUs and blocks selected in each state varied according to the birth rates, being higher in states with lower birth rates. Blocks were selected in a manner that ensured proportionate representation of urban, rural and tribal blocks, and PSU selection within a block ensured the proportionate representation of demonstration sites (DS),[3] replication sites and other sites. Sampling frames were generated for children 0-5 months and 6-23 months by prior house-listing and the target sample picked by circular systematic sampling, making allowance for a non-response rate of 15 percent. For each group, the target number to be completely interviewed was 733. Effectively, this resulted in a virtually self-weighted sample for each state.

There were changes in the extent of the program universe between the baseline and the endline, arising from factors unrelated to program interventions. Upon the advice of a Technical Advisory Group (TAG) that guided the endline survey, a comparison was made between background characteristics of the two universes, using available census data. Since only minor differences were found between the universes, the TAG recommended that comparisons between the baseline and endline universes should be considered valid. More details about the two universes can be found in the paper, *Methods Used for Assessments*, in this series.

Periodic Rapid Assessments (RAPs) in the Panel Districts

In order to monitor progress in outcomes to inform program strategies, a panel of one district from each of the eight states was established in 2003, where three rounds of periodic assessments were conducted between 2003 and 2005 at approximately annual intervals. The universe for these assessments was the first phase replication sites (the first batch of 25 percent AWCs in the district where at-scale implementation began).

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[3] As described in the paper, *Program Description*, a Demonstration Site (DS) was an AWC that held an NHD every month, had a community group that managed nutrition and health activities, had at least three active Change Agents and had other need-based innovations. The DS were largely supported by local NGOs, and served to demonstrate how these "best practices" were to be implemented, thus facilitating their replication to the rest of the district. The AWCs beyond DS that were reached by end-2004 were termed Replication Sites (RS) and the rest as "Others", in order to provide a sense of the duration of RACHNA interventions in different AWC.

Mothers of children 0-5 months of age were interviewed on antenatal, natal and newborn care and breastfeeding, while mothers of children 6-23 months old were interviewed on complementary feeding and immunization. Round 1 had a two-stage design, first randomly selecting five blocks from each district, and then five PSUs from each block, followed by selecting a fixed number of children 0-23 months old from each PSU, whose mothers were respondents. The target sample size was 150 for children 0-5 months old and 450 for children 6-23 months old. Rounds 2 and 3 used a one-stage design, directly picking 90 PSUs from the universe, spread across all blocks in the district, and then randomly selecting the target sample (460 each for the two age groups 0-5 and 6-23 months) from a sampling frame generated by house-listing after allowing for a 15 percent non-response. The latter samples were sufficient to detect a difference of 10 percentage points in estimates of two surveys with 95 percent significance and 80 percent power, assuming a small design effect. The estimates from the first round were therefore expected to be less precise than those for the subsequent rounds, particularly for the smaller sample of the 0-5 month group. The tools used in Round 1 were modified to add more questions and refine existing ones, while ensuring maximum comparability.

The Nutrition Evaluation Research

The nutrition evaluation research study was conducted by the Johns Hopkins Bloomberg School of Public Health to assess the impact of the INHP intervention package on the nutritional status of children 0-23 months old, when implemented at scale. The study lasted two years. It was located in two program districts – Barabanki in Uttar Pradesh and Karimnagar in Andhra Pradesh, using ICDS covered areas in Unnao in Uttar Pradesh and Rangareddy in Andhra Pradesh as non-intervention comparison. The study used a quasi-experimental pre-post design with multi-stage sampling. The baseline survey was conducted in 2003 and the endline survey was contemporaneous with the RACHNA program endline survey in early 2006. Two smaller "adequacy" surveys were conducted at intervals between the baseline and endline surveys. Sample sizes at the baseline and endline surveys were designed to be adequate to detect a difference of 0.18 in z scores of nutritional status.

More detail of these surveys and related information is available from the paper *Methods Used for Assessments in the RACHNA program*, in this series.

This paper draws evidence from all these sources. Most of the information on breastfeeding comes from interviews of mothers of children 0-5 months old from these surveys, while the information on complementary feeding comes from mothers of children 6 to 23 months of age.

In tabulating and presenting results, estimates of indicators are presented separately for each district or state as the case may be, and in most cases, the average program-wide estimates are not emphasized. This pattern has been followed to retain the focus on individual states and districts, among which there is considerable variability.

Also, statistical significance tests are not presented for most primary results, such as when comparing estimates for indicators across baseline and endline surveys, or

across rounds of RAPs. Most of the surveys were large sample surveys, designed to detect differences of 10 percentage points or more between two comparable rounds. While confidence intervals or p values could have been presented, this would have made the already large tables, each bearing results from eight states or districts, even less user-friendly. Instead, the authors have taken the view that it is safe to assume that a difference of 10 percentage points or more between rounds is likely to be statistically significant in most cases, and that showing statistical significance for differences of less than 10 percentage points may not be convincing from a program perspective. Thus, descriptions of results also generally distinguish between differences of 10 percentage points or more (as being statistically significant and programmatically relevant in most cases), and lesser differences (as being not convincing in most cases). While this approach oversimplifies the presentation of results, it should help the general reader interpret results more easily. More experienced and interested readers will look deeper, in any case.

Results and Discussion

As mentioned above, of the several aspects of infant and young child feeding practices, the program focused on the main gaps that were observed during early assessments and field observations. First, the evidence for change in these practices is presented, followed by the evidence related to various factors influencing change. The findings are then reviewed in the light of field observations and experience.

Changes in Infant and Young Child Feeding Practices

Evidence for change in feeding behaviors over the life of the program comes from the baseline and endline surveys and the RAPs from the eight panel districts. At the baseline survey, information on a limited number of indicators of feeding behavior was collected. These indicators are compared with endline estimates in Table 4.1. In addition to these indicators, more detail of feeding behaviors were available from the RAPs in the panel districts and from the endline survey. Changes in these additional indicators over the three rounds of RAPs are presented in Table 4.2.

Early initiation of breastfeeding and avoidance of prelacteals[4]

The proportion of mothers reporting that their infant was first put to the breast within two hours of birth increased substantially between baseline and endline in all states other than Rajasthan, and was paralleled by large reductions in the proportion of mothers reporting that they had not given anything to the child before putting the child to the breast for the first time after birth. The program level increase in breastfeeding within two hours of birth was about 29 percentage points, and the decrease in feeding prelacteals was about 38 percentage points. Some of the largest changes were seen in Uttar Pradesh and Jharkhand, where

[4] Since another paper in the series, *'Enhancing Newborn Care'* deals in detail with feeding and caring behaviors in the neonatal period, these are described only in brief here.

Table 4.1: Changes in selected infant and young child feeding behaviors, as per program wide evaluation between baseline (2001) and Endline (2006) surveys

Indicator	Andhra Pradesh			Chhattisgarh			Jharkhand			Madhya Pradesh			Orissa			Rajasthan			Uttar Pradesh			West Bengal			All		
	BL	EL	Change	BL	EL	Change	BL	EL	Change	BL	EL	Change	BL	EL	Change	BL	EL	Change	BL	EL	Change	BL	EL	Change	BL	EL	Change
BREASTFEEDING PRACTICES																											
n[1]	*106*	*205*		*160*	*549*		*115*	*501*		*160*	*415*		*163*	*565*		*172*	*474*		*205*	*467*		*121*	*396*				
Initiated breastfeeding within 2 hours of birth	44.4	73.2	**28.8**	31.9	70.9	**39.0**	7.2	60.1	**52.9**	31.9	52.5	**20.6**	33.5	55.4	**21.9**	22.4	28.7	**6.3**	6.5	56.3	**49.8**	42.5	56.3	**13.8**	26.2	54.9	**28.7**
Avoided prelacteals	64.5	85.4	**20.9**	23.8	87.6	**63.8**	11.7	83.8	**72.1**	23.8	71.6	**47.8**	55.9	73.6	**17.7**	27.0	29.1	**2.1**	8.1	57.8	**49.7**	46.4	60.9	**14.5**	30.6	68.3	**37.7**
n[2]	*192*	*670*		*172*	*686*		*150*	*590*		*172*	*614*		*185*	*690*		*221*	*623*		*253*	*614*		*197*	*634*				
EBF in previous 24 hours	69.1	79.4	**10.3**	80.1	83.4	**3.3**	58.6	89.8	**31.2**	80.1	82.4	**2.3**	73.3	83.8	**10.5**	45.7	73.6	**27.9**	64.8	70.0	**5.2**	61.4	67.2	**5.8**	65.7	78.7	**13.0**
n[3]	*116*	*410*		*100*	*406*		*71*	*361*		*100*	*384*		*90*	*421*		*136*	*370*		*168*	*363*		*136*	*365*				
EBF in previous 24 hours	78.4	83.1	**4.7**	86.5	84.7	**-1.8**	72.6	91.0	**18.4**	86.5	86.6	**0.1**	80.9	88.2	**7.3**	49.2	82.3	**33.1**	71.1	76.8	**5.7**	68.0	72.1	**4.1**	73.7	83.1	**9.4**
Drop out in 24-hour EBF after 4 months (%)	11.9	4.5	**-7.4**	7.4	1.5	**-5.9**	19.3	1.3	**-18.0**	7.4	4.9	**-2.5**	9.4	5.0	**-4.4**	7.1	10.6	**3.5**	8.9	8.9	**-0.0**	9.7	6.8	**-2.9**	10.8	5.2	**-5.6**
COMPLEMENTARY FEEDING PRACTICES																											
n[4]	*561*	*760*		*564*	*680*		*623*	*645*		*564*	*689*		*556*	*697*		*566*	*679*		*534*	*668*		*510*	*682*				
Initiated semi-solid/solids between 6-8 months of age along with continued breastfeeding	47.8	61.2	**13.4**	43.8	65.1	**21.3**	63.8	72.1	**8.3**	43.8	58.2	**14.4**	50.0	64.0	**14.0**	50.5	35.9	**-14.6**	48.3	40.6	**-7.7**	60.7	73.2	**12.5**	52.6	59.2	**6.6**

n[1] = Infants, 0-5 months old, born at home; *n*[2] = Infants 0-5 months old; *n*[3] = Infants 0-3 months old; *n*[4] = Children 6-23 months old; BL = Baseline survey; EL = Endline survey; Change = Change from BL to EL.

improved practices were reported by more than 50 percent of mothers by the endline, starting with about 10 percent or less at the baseline. The lack of change in Rajasthan appears to be attributable to strongly entrenched cultural beliefs, where families feel compelled to feed water or other liquids to newborn babies, rather than providing immediate breastfeeding.

Exclusive breastfeeding

Exclusive breastfeeding (EBF) rates are generally expressed as the proportion of children under six months who have not been given anything other than breast milk and medicines in the previous 24 hours. This indicator is presented in Table 4.1 with the caveat that it was not measured in a similar manner in the baseline and endline surveys but that the differences in definitions tend to underestimate the magnitude of increase in EBF from baseline to endline.[i] As shown in the table, in infants less than six months old, 24-hour EBF rates have increased 13 percentage points from the baseline to reach about 79 percent program-wide. Four states had a greater than 10 percentage points increase, the highest changes being seen in Jharkhand (31 percentage points) and Rajasthan (28 percentage points). In infants less than four months old, the baseline-endline changes are similar but less marked. The proportion of children dropping out of exclusive breastfeeding between four and six months ranged from seven percent to 19 percent at the baseline across different states, to between one percent and 11 percent at the endline, again suggesting that exclusive breastfeeding practices improved between the two surveys. It is noteworthy that in five of the eight states, the endline estimates for 24-hour EBF in children up to six months of age was 80 percent or more, and around 70 percent in the remaining three states.

Age at introduction of semi-solids

The age at which introduction of semi-solid into the child's diet was measured on the basis of mother's recall of the age at which the child was first introduced to semi-solid, recorded in completed months. In five of the eight states, there have been improvements of 10 percentage points or more in the proportion of children introduced to semi-solid at the right age between the baseline and the endline. One state, Rajasthan, showed a decrease (Table 4.1).

Because indicators on other feeding practices are not available from the baseline, results are presented from the three rounds of RAPs in the panel districts in Table 4.2.

Recommended frequency of complementary feeds

The frequency of feeding of cereal-based meals as complementary foods[5] is shown in Table 4.2.[6] The proportion of children 6-11 months of age reported to have been fed at the recommended frequency in the 24 hours prior to the interview increased 10 percentage points or more over the two-year period between Rounds 1 and 3

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[5] In *Guiding principles for complementary feeding of the breastfed child (2003)*, the WHO recommends that breastfed children 6-23 months of age be fed meals of semi-solid/solid foods at the following frequency:

- 6-8 months: 2-3 meals per day
- 9-23 months: 3-4 meals per day

[6] The estimates in Table 4.2 are based on the meals fed by an adult or a sibling older than 12 years, from a separate plate or bowl in the 24 hours prior to the interview. These are somewhat conservative estimates of actual numbers of semi-solid meals consumed by children, but represent the portion of frequency most likely to be influenced by the program.

Table 4.2: Changes in selected infant and young child feeding behaviors, Panel districts, RAPs Round 1, 2 and 3 (2003-2004-2005)

Indicator	Andhra Pradesh				Chhattisgarh				Jharkhand				Madhya Pradesh				Orissa				Rajasthan				Uttar Pradesh				West Bengal			
	R1	R2	R3	Change R1 to R3	R1	R2	R3	Change R1 to R3	R1	R2	R3	Change R1 to R3	R1	R2	R3	Change R1 to R3	R1	R2	R3	Change R1 to R3	R1	R2	R3	Change R1 to R3	R1	R2	R3	Change R1 to R3	R1	R2	R3	Change R1 to R3
BREASTFEEDING PRACTICES																																
n[1]	*77*	*125*	*136*		*142*	*381*	*435*		*155*	*341*	*336*		*123*	*378*	*348*		*125*	*352*	*364*		*91*	*404*	*369*		*147*	*393*	*347*		*74*	*176*	*153*	
Initiated breastfeeding within 2 hours of birth	na	83.2	85.3	**2.1**	na	85.6	97.2	**11.6**	na	64.5	83.6	**19.1**	na	78.8	86.2	**7.4**	na	76.7	94.0	**17.3**	na	66.8	64.5	**-2.3**	na	27.0	77.5	**50.5**	na	84.7	90.2	**5.5**
Avoided prelacteals	44.2	77.6	80.9	**36.7**	79.6	93.4	97.5	**17.9**	52.9	56.3	70.2	**17.3**	47.2	62.6	69.0	**21.8**	50.4	47.2	76.1	**25.7**	15.4	26.7	15.2	**-0.2**	10.9	18.3	59.4	**48.5**	31.1	62.5	69.3	**38.2**
n[2]	*153*	*351*	*417*		*162*	*446*	*490*		*177*	*398*	*411*		*152*	*445*	*451*		*150*	*466*	*467*		*133*	*473*	*447*		*171*	*462*	*448*		*164*	*460*	*430*	
Exclusively breastfed (24 hour recall)	68.6	74.1	80.3	**11.7**	86.4	88.1	89.4	**3.0**	78.5	77.1	75.9	**-2.6**	62.5	71.9	76.7	**14.2**	76.0	68.0	77.9	**1.9**	45.1	36.6	24.8	**-20.3**	59.6	54.5	71.7	**12.1**	51.2	63.5	65.6	**14.4**
COMPLEMENTARY FEEDING PRACTICES																																
n[3]	*442*	*416*	*488*		*456*	*470*	*485*		*455*	*401*	*450*		*456*	*452*	*448*		*450*	*491*	*448*		*342*	*474*	*454*		*435*	*465*	*475*		*461*	*483*	*455*	
Initiated semi-solid/ solids between 6-8 months of age along with continued breastfeeding	32.4	78.4	76.2	**43.8**	44.7	63.2	86.8	**42.1**	58.5	64.8	66.4	**7.9**	48.5	52.2	52.5	**4.0**	60.4	63.5	70.3	**9.9**	47.7	50.8	56.6	**8.9**	48.0	40.4	59.8	**11.8**	75.1	85.3	74.3	**-0.8**
n[4]	*120*	*149*	*173*		*165*	*130*	*164*		*149*	*141*	*159*		*125*	*149*	*157*		*163*	*160*	*147*		*116*	*144*	*134*		*138*	*181*	*130*		*137*	*156*	*141*	
Recommended frequency of complementary feeds	45.0	39.6	63.0	**18.0**	39.0	48.5	64.0	**25.0**	13.4	20.6	26.4	**13.0**	34.0	44.0	38.9	**4.9**	48.0	29.0	61.2	**13.2**	20.7	24.3	29.9	**9.2**	9.0	12.0	34.6	**25.6**	27.4	32.7	45.4	**18.0**
Fed the recommended quantity of semi-solid/ solids	2.5	6.7	12.1	**9.6**	1.2	5.4	1.2	**0.0**	0.0	8.5	0.6	**0.6**	0.8	0.0	1.3	**0.5**	4.3	1.9	19.7	**15.4**	0.0	2.8	1.5	**1.5**	0.0	0.0	1.5	**1.5**	0.7	9.6	17.0	**16.3**
Fed at least half the recommended quantity of semi-solid/solids	29.2	28.2	46.8	**17.6**	11.5	26.2	22.0	**10.5**	2.0	21.3	10.1	**8.1**	4.8	12.1	19.1	**14.3**	22.1	20.6	51.0	**28.9**	7.8	14.6	16.4	**8.6**	2.2	0.6	10.0	**7.8**	16.8	34.6	40.4	**23.6**
n[5]	*322*	*267*	*315*		*291*	*340*	*321*		*306*	*260*	*291*		*331*	*303*	*291*		*287*	*331*	*301*		*226*	*330*	*320*		*297*	*284*	*345*		*324*	*327*	*314*	
Recommended frequency of complementary feeds	42.9	43.4	39.5	**-3.4**	59.8	50.6	71.0	**11.2**	27.1	43.8	36.8	**9.7**	58.9	58.4	37.1	**-21.8**	47.4	35.3	56.5	**9.1**	26.1	44.8	40.9	**14.8**	23.6	23.6	36.5	**12.9**	30.6	42.8	43.0	**12.4**
Fed the recommended quantity of semi-solid/ solids	na	0.0	0.3	**0.3**	na	0.0	0.0	**0.0**	na	1.9	0.0	**-1.9**	na	0.0	0.0	**0.0**	na	0.6	6.0	**5.4**	na	0.3	0.0	**-0.3**	na	0.0	0.0	**0.0**	na	3.1	3.2	**0.1**
Fed at least half the recommended quantity of semi-solid/solids	9.0	11.6	34.0	**25.0**	3.8	9.4	8.4	**4.6**	4.9	27.7	9.3	**4.4**	1.5	8.9	8.9	**7.4**	16.0	15.7	42.9	**26.9**	2.7	10.6	5.0	**2.3**	0.3	2.5	7.2	**6.9**	8.3	27.8	31.8	**23.5**
n[6]	*116*	*134*	*172*		*95*	*117*	*163*		*120*	*112*	*159*		*84*	*107*	*157*		*134*	*125*	*147*		*72*	*91*	*134*		*104*	*114*	*127*		*133*	*145*	*141*	
Received at least 3 different food groups in last 1 week	88.8	90.3	89.0	**0.2**	73.7	78.6	79.1	**5.4**	46.7	64.3	59.7	**13.0**	73.8	76.6	59.9	**-13.9**	67.9	67.2	75.5	**7.6**	83.3	85.7	66.4	**-16.9**	71.2	82.5	63.8	**-7.4**	77.4	84.8	76.6	**-0.8**
Added oil or ghee to meals	44.0	54.5	39.5	**-4.5**	15.8	34.2	31.3	**15.5**	12.5	7.1	10.1	**-2.4**	22.6	15.9	21.0	**-1.6**	7.5	9.6	34.0	**26.5**	41.1	46.2	49.3	**8.2**	15.4	20.2	26.0	**10.6**	24.1	11.0	15.6	**-8.5**

Estimates in this table are from three rounds of assessments (RAPs) conducted in a panel of districts, one from each state: Khammam (AP), Kanker (CG), Lohardaga (JH), Seoni (MP), Kalahandi (Orissa), Bikaner (Rajasthan), Rae Bareli (UP), Bankura (WB).

n[1] = Infants, 0-5 months old born at home; *n*[2] = Infants, 0-5 months old; *n*[3] = Children, 6-23 months old; *n*[4] = Infants, 6-11 months old; *n*[5] = Children, 12-23 months old; *n*[6] = Mothers of 6-11 mo infants giving complementary feed; Change = Change from R1 to R3, na = Not applicable.

in six of the eight panel districts. Similar results were seen among children 12-23 months of age, in four of the eight districts. In this age-group, there was a drop in the proportion of those who received complementary feeding at the recommended frequency in the panel district in Madhya Pradesh, though the reasons are unclear.

Recommended quantities of complementary foods: volumes and calories

The WHO currently recommends certain amounts of complementary foods to be fed daily to breastfed infants and young children over 6 months of age expressed in terms of age-specific energy intake recommendations.[7] In nutrition surveys, information about energy and other nutrient intake is typically gathered in one or more elaborate 24-hour dietary recalls, where the attempt is to record all of the food consumed by the child. In the surveys in the RACHNA program, a more conservative estimate of energy intake was derived using a shorter version of the 24-hour dietary recall,[ii] which closely reflected the central "message" of complementary feeding promoted by RACHNA,[8] and thus represented the portion of the total dietary intake most likely to be influenced by the program. Other than energy, the intake of specific nutrients was not quantified.

As presented in Table 4.2, very few children received recommended quantities of food. Because this was close to zero in round one estimates for the proportion of children reportedly fed *at least half the recommended quantities* are also presented. Even these estimates were very low in Round 1: among 6-11 month-olds, it exceeded 10 percent of the infants only in four districts, and among 12-23 month olds, it exceeded 10 percent in only one district (Orissa). After two years, many of the districts showed positive trends. Among 6-11 month old children, five districts (panel districts of Andhra Pradesh, Chhattisgarh, Madhya Pradesh, Orissa and West Bengal) showed an increase of more than 10 percentage points, and in two of them (Andhra Pradesh and Orissa), about half the children received at least half the recommended quantities by Round 3. Among 12-23 month-old children, three districts (Andhra Pradesh, Orissa and West Bengal) showed an improvement of more than 20 percentage points. Around a third or more of the children in these districts are reported to receive at least half the recommended quantities. These are conservative estimates of energy intake and actual total intakes are likely to be somewhat greater.[iii] In Jharkhand, where there was a decrease between Rounds 2 and 3, field observations indicate that the implementers did not sustain focus on feeding more quantities over time.

Energy density

The program promoted the use of additional oil or ghee to children's meals to enhance the energy density of the meals. As shown in Table 4.2, in three of eight districts (in Chhattisgarh, Orissa and Uttar Pradesh), the proportion of mothers of children 6-11 months old reporting that oil or ghee had been added to meals increased by 10 percentage points or more over two years.

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[7] In *Guiding principles for complementary feeding of the breastfed child (2003)*, the WHO recommends that breastfed children 6-23 months of age be fed complementary foods to provide the following average amounts of additional energy:

- 6-8 months: 200 kcal per day
- 9-11 months: 300 kcal per day
- 12-23 months: 550 kcal per day

[8] The program promoted feeding "increasing quantities of semi-solid or solids such as rice, *roti*, dal, *khichdi*, etc., by an adult, out of a separate plate or bowl".

Variety in diet

The reported consumption of three or more food groups in the week prior to the interview is estimated from a series of prompted questions with regard to each food group. There are no consistent patterns seen across districts, which may be due to fluctuations in availability and utilization of different kinds of foods.

In sum, significant improvements appear to have occurred in a number of feeding behaviors across states, the most important being achievements of high levels of exclusive breast feeding and the improvements in volumes of complementary foods fed to children. However, despite significant improvements, the low attained level of complementary feeding practices remains an area of major concern, and certainly contributes to the high levels of malnutrition in these states.

Comparisons with non-RACHNA Served Areas

INHP-II Endline vs NFHS-3

State-level estimates of the RACHNA endline survey indicators can be potentially compared with the approximately contemporaneous state-level assessments: the third round of NFHS which was conducted in early 2006. The NFHS-3 estimates could be assumed to represent entire states, and can be interpreted as the weighted averages of RACHNA-served and non-RACHNA-served areas. Comparing those results to the RACHNA endline provides one of the measures of influence of the RACHNA program interventions.

Early results from NFHS-3 provide estimates of exclusive breastfeeding in children up to six months old and complementary feeding at 6-9 months of age. The RACHNA and NFHS-3 surveys use similar but not the same questions for generating these indicators.[iv]

Figure 4.1 compares estimates of the 24-hour EBF indicator among children 0-5 months of age between RACHNA endline and NFHS-3. Except in the case of Chhattisgarh, where both RACHNA and NFHS-3 endline estimates are very close, the RACHNA endline estimates are about 10 percent to 60 percent

Figure 4.1: **Children 0-5 months exclusively breastfed in the last 24 hours, RACHNA Endline (2006) and NFHS-3 (2006).**

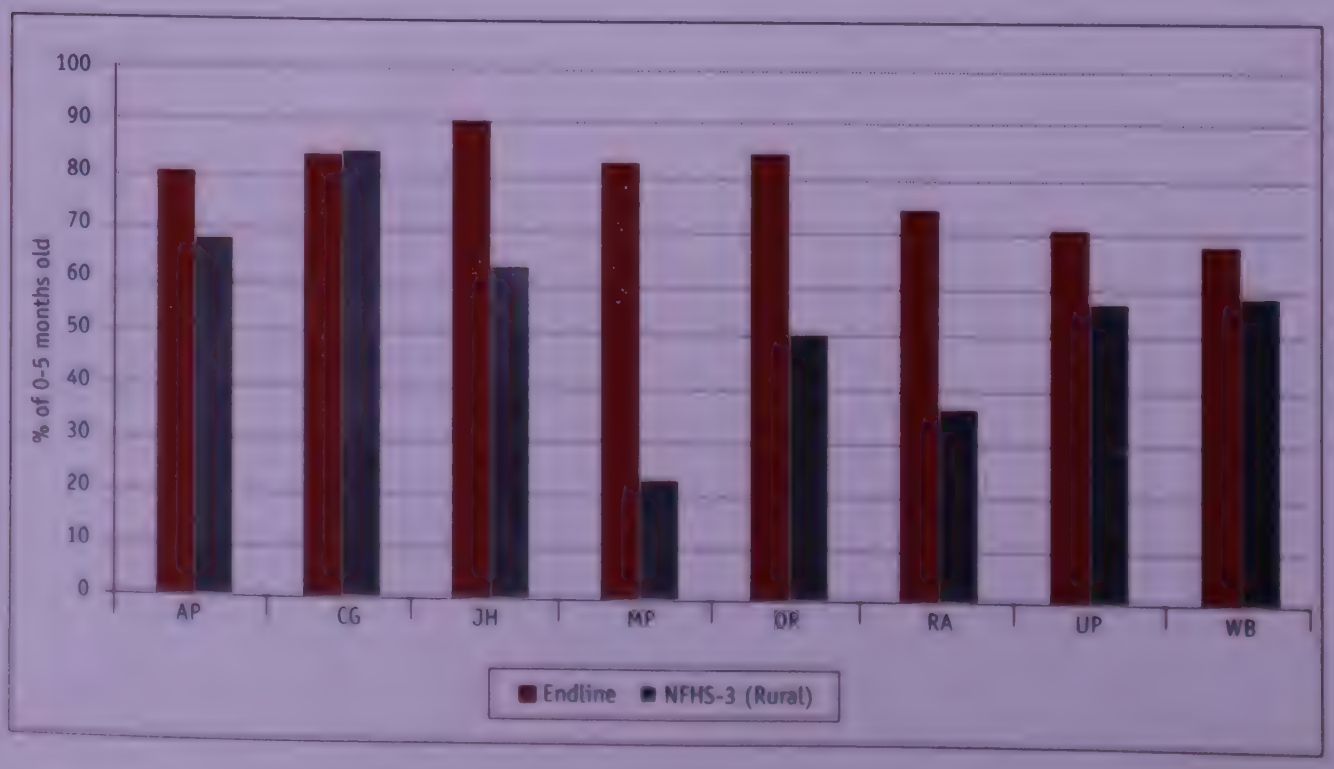
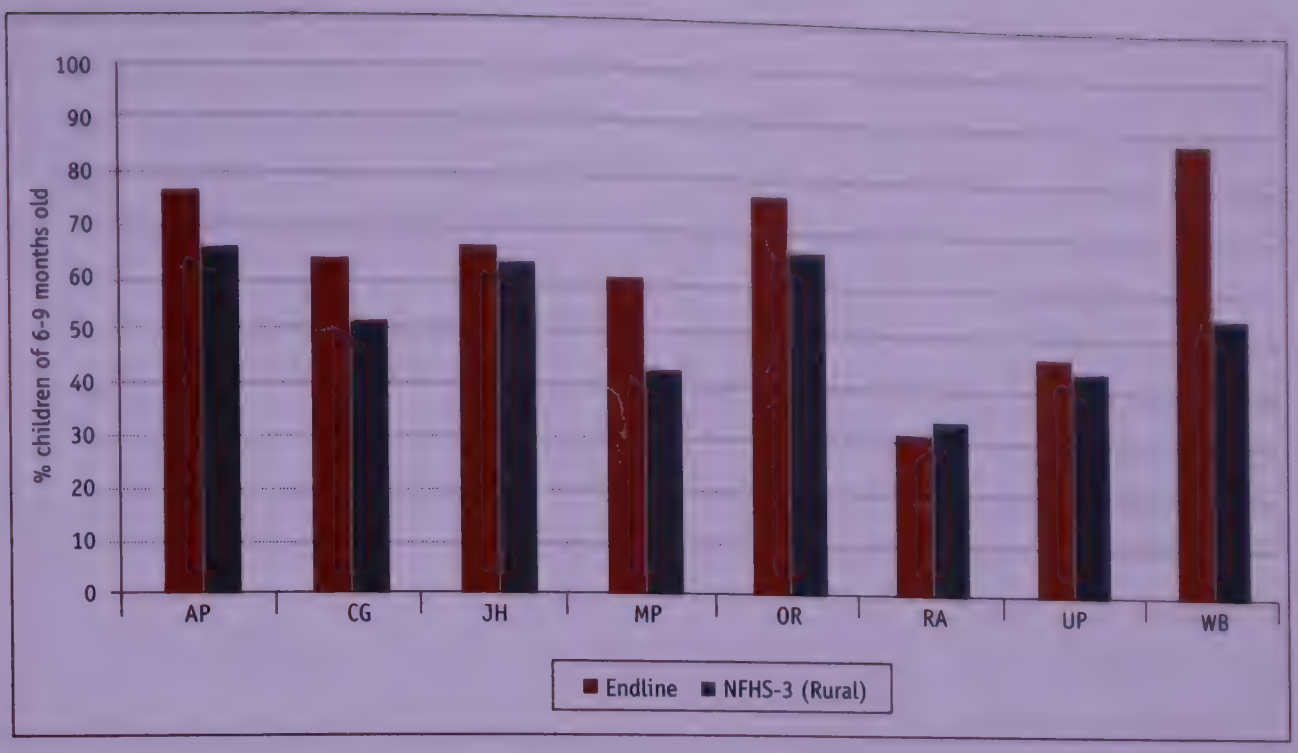


Figure 4.2: **Children 6-9 months old receiving solid or semi-solid food and breast milk, RACHNA Endline (2006) and NFHS-3 (2006).**



higher than NFHS-3 estimates. Overall, the pattern appears to indicate that EBF is clearly more common in RACHNA served areas than in other areas in the same state.[v]

Figure 4.2 presents comparisons for the proportion of mothers of children 6-9 months old reporting that the child was fed breast milk and any of a variety of solids or semi-solid. In five of the states, RACHNA endline estimates for this indicator are greater than NFHS-3 estimates by 10 percentage points or more, while they are virtually equal in the three other states (Jharkhand, Rajasthan and Uttar Pradesh).[9]

The Nutrition Evaluation Research Study

The Nutrition Evaluation Research (NER) study involved two RACHNA program districts, Barabanki (Uttar Pradesh) and Karimnagar (Andhra Pradesh) and two non-RACHNA districts, Unnao (Uttar Pradesh) and Rangareddy (Andhra Pradesh) for comparison. Table 4.3 presents estimates from the baseline and endline assessments from these four districts for a number of infant feeding indicators, comparing changes over two years between the two districts in each pair. The study concluded that, compared to control districts, there was a greater increase in early breastfeeding and avoidance of pre-lacteal feeds in the RACHNA districts. The RACHNA district in Uttar Pradesh also had a significantly greater increase in the levels of exclusive breastfeeding and in the frequency and volumes of feeding complementary foods compared to the control district. The proportion of children being fed adequate amounts remained very small even in the intervention district. Both intervention districts showed greater evidence of effort by families to feed children, compared to the non-intervention districts (in terms of children being fed by the mother or fed from a separate plate).

Taken together, it appears that infant feeding practices changed faster and reached higher levels in at least some of the states and districts covered by the RACHNA program interventions, as compared to non-RACHNA served areas in the same states.

[9] Since these estimates are based on small denominators in both, RACHNA and NFHS-3 surveys, the results must be interpreted with caution.

Table 4.3: Changes in selected infant and young child feeding behaviors, Nutrition ER (2004-2006)

BREASTFEEDING BEHAVIORS (0-5 months old)	% Breastfeeding initiated 1 hour after delivery (n)												
	Intervention (Karimnagar AP)			Comparison (Rangareddy AP)			Diff of Change	Intervention (Barabanki UP)			Comparison (Unnao UP)			Diff of Change
	Baseline	Endline	Change	Baseline	Endline	Change		Baseline	Endline	Change	Baseline	Endline	Change	
Breastfeeding initiated 1 hour after delivery														
n[1]	*614*	*545*		*591*	*610*			*789*	*741*		*711*	*658*		
%	22.3	36.5	**14.2**	16.9	18.9	**2.0**	***12.2****	4.6	59.0	**54.4**	2.1	10.5	**8.4**	***46.0****
Prelacteal feeds														
n[1]	*614*	*545*		*591*	*611*			*789*	*750*		*711*	*661*		
%	61.7	49.2	**12.5**	69.0	67.6	**1.4**	***11.1****	91.8	44.4	**47.4**	96.1	93.2	**2.9**	***44.5****
Exclusive breastfeeding														
n[1]	*614*	*549*		*591*	*616*			*789*	*758*		*712*	*679*		
%	77.0	70.7	**6.3**	86.8	77.0	**9.8**	***3.5***	63.5	78.5	**15.0**	62.8	70.7	**7.9**	***7.1****

COMPLEMENTARY FEEDING BEHAVIORS (6-23 months old)	Intervention (Karimnagar)			Comparison (Rangareddy)			Diff of Change	Intervention (Barabanki)			Comparison (Unnao)			Diff of Change
	Baseline	Endline	Change	Baseline	Endline	Change		Baseline	Endline	Change	Baseline	Endline	Change	
Introduction of solids at 6-8 months														
n[2]	*1746*	*2012*		*1831*	*2034*			*1643*	*1650*		*1666*	*1624*		
%	30.4	49.5	**19.1**	24.6	35.7	**11.1**	***8.0****	22.1	52.8	**30.7**	26.8	56.5	**29.7**	***1.0***
Consumption of 3 food groups in the past 24 hours														
n[2]	*1746*	*2012*		*1831*	*2034*			*1643*	*1650*		*1666*	*1624*		
6-8 months	5.1	8.2	**3.1**	0.8	3.9	**3.1**	***0.0***	2.4	22.4	**20.0**	2.8	10.9	**8.1**	***11.9****
9-11 months	8.2	14.7	**6.5**	2.9	6.6	**3.7**	***2.8***	9.4	39.2	**29.8**	14.4	32.9	**18.5**	***11.3****
12-23 months	15.0	22.1	**7.1**	4.6	16.3	**11.7**	***4.6****	25.6	53.4	**27.8**	31.1	43.7	**12.6**	***15.2****
Consumption of at least half the recommended quantity of solids														
n[2]	*1746*	*2012*		*1831*	*2034*			*1643*	*1650*		*1666*	*1624*		
6-8 months (100+ g)	26.7	43.2	**16.5**	16.0	27.6	**11.6**	***4.9***	1.0	6.0	**5.0**	0.8	1.3	**0.5**	***4.5****
9-11 months (150+ g)	18.0	36.6	**18.6**	8.3	23.2	**13.9**	***4.7***	0.5	6.0	**5.5**	2.4	1.0	**1.4**	***6.9****
12-23 months (200+ g)	20.1	44.8	**24.7**	10.3	35.7	**25.4**	***0.7***	1.5	6.9	**5.4**	2.1	3.2	**1.1**	***4.3****
Recommended complementary feeding frequency amongst breastfed children														
n[2]	*1620*	*1893*		*1702*	*1901*			*1447*	*1476*		*1445*	*1473*		
6-8 months (2+ times/d)	34.5	56.1	**21.6**	11.4	35.5	**24.1**	***3.5***	2.3	25.4	**23.1**	3.2	18.2	**15.0**	***8.1****
9-11 months (3+ times/d)	12.9	28.3	**15.4**	7.6	17.3	**9.7**	***5.7***	3.1	23.9	**20.8**	4.6	11.3	**6.7**	***14.1****
12-23 months (3+ times/d)	15.5	42.4	**26.9**	9.6	40.9	**31.3**	***4.4***	8.8	37.8	**29.0**	15.9	31.3	**15.4**	***13.6****
Oil added to solids														
n[2]	*1620*	*1677*		*1702*	*1656*			*1447*	*1476*		*1445*	*1473*		
6-8 months	8.9	10.1	**1.2**	0.0	3.5	**3.5**	***2.3***	0.0	4.2	**4.2**	0.0	1.0	**1.0**	***3.2****
9-11 months	5.1	7.8	**2.7**	1.1	4.8	**3.7**	***1.0***	1.7	10.1	**8.4**	0.0	5.1	**5.1**	***3.3***
12-23 months	3.1	5.5	**2.4**	0.9	3.9	**3.0**	***0.6***	1.4	7.4	**6.0**	1.6	7.6	**6.0**	***0.0***
Usually fed by mother														
n[2]	*1746*	*2012*		*1831*	*2034*			*1643*	*1650*		*1666*	*1624*		
6-8 months	66.8	86.1	**19.3**	51.7	78.1	**26.4**	***7.1****	14.0	56.8	**42.8**	17.1	44.9	**27.8**	***15.0****
9-11 months	71.2	85.4	**14.2**	73.9	82.2	**8.3**	***5.9****	30.7	71.4	**40.7**	34.6	64.8	**30.2**	***10.5****
12-23 months	64.3	78.8	**14.5**	63.5	69.0	**5.5**	***9.0****	32.7	51.7	**19.0**	37.6	45.1	**7.5**	***11.5****
Fed from a separate plate														
n[2]	*1746*	*2012*		*1831*	*2034*			*1643*	*1650*		*1666*	*1624*		
6-8 months	61.1	67.6	**6.5**	38.2	52.2	**14.0**	***7.5****	5.1	41.2	**36.1**	7.4	21.8	**14.4**	***21.7****
9-11 months	75.5	81.9	**6.4**	63.0	69.9	**6.9**	***0.5***	19.8	44.7	**24.9**	19.2	26.7	**7.5**	***17.4****
12-23 months	77.8	81.4	**3.6**	70.4	74.4	**4.0**	***0.4***	37.0	57.8	**20.8**	45.4	49.9	**4.5**	***16.3****

n[1] = Total no. of children 0-5 months; *n*[2] = Total no. of children 6-23 months; * Significant at 95% confidence level

Factors Influencing Infant Feeding Practices

The influence of program strategies

The RACHNA program promoted a wide range of strategies involving interpersonal contacts between families and service providers and mass communication interventions for improving infant feeding behaviors. Both were approached through: (i) advocacy for action at various levels within government systems and community leadership forums; (ii) capacity building to enhance awareness of the problem of malnutrition and the contribution of poor feeding practices to malnutrition; (iii) the generation and use of relevant data for action and planning; and (iv) catalyzing improvements in program management approaches that encouraged planning and implementation to achieve concrete, measurable outcomes. Following well-recognized principles of behavior change communication, interpersonal contacts were given the priority in these strategies, using mass communication campaigns to raise general awareness and supplement the one-on-one efforts of frontline workers and volunteers.

Since the INHP-I endline assessment (which served as the INHP-II/RACHNA baseline) did not include detailed information about these processes, comparisons between baseline and endline are not possible. However, the RAPs from the panel districts, and the program endline survey did measure a number of process indicators. Detailed information is available from mothers' interviews about contacts between specified service providers and families, including home visits during specified periods and other contacts. Information is also available for what advice was given during the contact, regarding a number of specified child caring and feeding behaviors.

Contacts by service providers

A key strategy promoted during RACHNA was that the AWW (*Anganwadi* Workers) or ANM (Auxillary Nurse Midwife) or volunteers make home visits during critical periods and provide appropriate information/advice that would lead to changed behaviors related to delivery, newborn care and feeding. Table 4.4 presents trends in the proportion of mothers who delivered at home, reporting home visits by AWW or ANM during specific periods of pregnancy or the first two years of the child's age, over successive rounds of RAPs in panel districts: Overall, the proportion of mothers reporting home visits increased during the project period in most states. The proportion of mothers reporting that they had been visited at home in the last trimester by either the AWW or the ANM increased by more than 15 percentage points in four districts (Andhra Pradesh, Chhattisgarh, Orissa and Uttar Pradesh) between the first and third rounds of RAPs. First day visits, expected to be more difficult to accomplish, increased in the same four districts. In the panel district in Orissa and Chhattisgarh, more than half the births were reported to have been attended by the AWW or the ANM on the day of birth, while in Andhra Pradesh and Uttar Pradesh, between a quarter and a third of mothers reported such visits. The proportion of mothers of children 0-5 months old who reported being contacted either during pregnancy or on the day of birth and receiving advice related to breastfeeding went up more than about 40 percentage points between the first and third rounds in five districts, steadily increasing over rounds in most cases. The proportion of mothers of children 6-17 months old who reported being visited at home by the AWW or ANM in the previous month had increased by about 20

Table 4.4: Changes in contacts and advice by AWW or ANM, RAPs Rounds 1, 2 and 3 (2003, 2004, 2005)

Indicator	Andhra Pradesh				Chhattisgarh				Jharkhand				Madhya Pradesh				Orissa				Rajasthan				Uttar Pradesh				West Bengal			
	R1	R2	R3	Change	R1	R2	R3	Change	R1	R2	R3	Change	R1	R2	R3	Change	R1	R2	R3	Change	R1	R2	R3	Change	R1	R2	R3	Change	R1	R2	R3	Change
n[1]	*153*	*351*	*417*		*162*	*446*	*490*		*177*	*398*	*411*		*152*	*445*	*451*		*150*	*466*	*467*		*133*	*473*	*447*		*171*	*462*	*448*		*164*	*460*	*430*	
Visited by AWW/ANM at home in the last trimester of pregnancy	61.4	62.7	80.3	**18.9**	58.0	72.6	89.6	**31.6**	36.7	27.6	32.6	**-4.1**	58.6	62.5	53.0	**-5.6**	48.0	60.3	77.9	**29.9**	9.0	22.8	16.3	**7.3**	39.8	54.1	56.5	**16.7**	63.4	52.4	66.5	**3.1**
n[2]	*77*	*125*	*136*		*142*	*381*	*435*		*155*	*341*	*336*		*123*	*378*	*348*		*125*	*352*	*364*		*100*	*404*	*369*		*147*	*393*	*347*		*74*	*176*	*153*	
Visited by AWW/ANM at home on the day of birth	16.9	28.8	30.9	**14.0**	28.2	38.6	48.5	**20.3**	16.8	16.1	19.9	**3.1**	17.1	16.4	27.9	**10.8**	16.8	28.4	54.9	**38.1**	16.0	12.4	9.8	**-6.2**	14.3	9.2	27.1	**12.8**	5.4	4.0	10.5	**5.1**
Breastfeeding related advice received by the day of birth	28.6	41.6	72.1	**43.5**	41.5	65.4	87.4	**45.9**	26.5	24.3	29.5	**3.0**	27.6	35.4	37.6	**10.0**	16.8	32.1	70.3	**53.5**	6.4	11.1	10.0	**3.6**	15.6	22.9	54.5	**38.9**	5.4	26.1	48.4	**43.0**
n[3]		*304*	*351*			*310*	*349*			*299*	*319*			*328*	*342*			*324*	*319*			*262*	*326*			*324*	*322*			*314*	*331*	
Any contact by AWW/ANM in the last month	na	64.1	58.7	**-5.4**	na	66.8	77.1	**10.3**	na	39.5	33.5	**-6.0**	na	41.8	49.7	**7.9**	na	51.9	77.4	**25.5**	na	18.3	17.2	**-1.1**	na	32.4	56.2	**23.8**	na	48.4	68.3	**19.9**
Visited at home by AWW/ ANM in the last month	na	45.4	45.0	**-0.4**	na	32.8	52.4	**19.6**	na	15.1	9.1	**-6.0**	na	13.7	18.4	**4.7**	na	22.2	54.5	**32.3**	na	11.5	10.1	**-1.4**	na	16.4	46.0	**29.6**	na	32.5	54.4	**21.9**
Advised to give rice, dal, *khichdi* to the child (prompted)	na	41.1	52.1	**11.0**	na	60.0	69.9	**9.9**	na	12.7	16.3	**3.6**	na	25.0	33.3	**8.3**	na	18.5	61.1	**42.6**	na	6.1	7.4	**1.3**	na	12.7	39.4	**26.7**	na	34.7	58.0	**23.3**
Advised to feed ar least twice a day (unprompted)	na	40.8	51.3	**10.5**	na	55.5	68.5	**13.0**	na	11.0	14.4	**3.4**	na	22.3	30.4	**8.1**	na	17.0	58.6	**41.6**	na	5.3	7.1	**1.8**	na	10.2	38.8	**28.6**	na	18.5	51.4	**32.9**
Advised correct frequency of feeding (unprompted)	na	32.9	45.9	**13.0**	na	44.8	57.9	**13.1**	na	7.4	9.7	**2.3**	na	15.2	21.3	**6.1**	na	9.6	47.3	**37.7**	na	3.1	4.9	**1.8**	na	7.1	33.2	**26.1**	na	10.2	43.5	**33.3**
Advised to feed in a separate bowl (unprompted)	na	15.8	16.0	**0.2**	na	8.4	21.8	**13.4**	na	1.0	2.5	**1.5**	na	3.4	6.7	**3.3**	na	3.1	14.1	**11.0**	na	2.3	2.8	**0.5**	na	4.3	17.4	**13.1**	na	9.2	25.4	**16.2**
Advised to feed different types of food (unprompted)	na	7.9	28.2	**20.3**	na	14.2	20.3	**6.1**	na	1.7	0.9	**-0.8**	na	5.2	7.6	**2.4**	na	4.3	22.3	**18.0**	na	1.9	0.6	**-1.3**	na	4.3	11.8	**7.5**	na	3.2	9.1	**5.9**
Missed opportunity for feeding advice (proportion of those contacted who did not receive advice about feeding semi-solid)	na	35.9	11.2	**-24.6**	na	10.2	9.3	**-0.8**	na	67.8	51.3	**-16.5**	na	40.2	33.0	**-7.2**	na	64.4	21.1	**-43.3**	na	66.7	57.0	**-9.7**	na	60.8	29.9	**-30.9**	na	28.3	15.1	**-13.2**

na: not available in a form comparable to other rounds

n[1] = Mothers of 0-5 months infants; *n*[2] = Infants 0-5 months old, born at home; *n*[3] = Children 6-17 months olds; R1 = Round 1; R2 = Round 2; R3 = Round 3; Change = Change from Round 1 to Round 3

percentage points or more in four districts (Chhattisgarh, Orissa, Uttar Pradesh and West Bengal). In five of the eight districts, between 45 percent and 55 percent of respondents reported receiving at least one home visit in the previous month by either the AWW or the ANM in Round 3. However, in the panel districts of Jharkhand, Madhya Pradesh and Rajasthan, the proportion of women reporting home visits in the previous month was less than 20 percent even in Round 3.

Advice received from service providers

The respondents who reported any contacts with service providers or volunteers were asked whether anyone had advised them to give cereal-based semi-solid/ solid food to the child, how often they were told to feed the child and to list the different pieces of advice that they received related to feeding foods other than breast milk. This information is presented in Table 4.4 as the proportion of all women who received each kind of advice.[10]

The proportion of mothers of children 6-17 months old reporting that they had been advised to feed the child semi-solid at a certain frequency appropriate for the age of the child (*see* footnote 5) increased by more than 20 percentage points in Orissa, Uttar Pradesh and West Bengal, and by more than 10 percentage points in Andhra Pradesh and Chhattisgarh between Rounds 2 and 3. By Round 3, more than half the women in four of the eight districts (Andhra Pradesh, Chhattisgarh, Orissa and West Bengal) said they had received such advice. The proportion of those contacted, who did not receive even basic feeding advice is presented in Table 4.4 as "missed opportunity for feeding advice". By Round 3 the missed opportunities decreased in all the districts, suggesting that service providers were paying increasing attention to feeding advice. As shown in the table, significant improvements were also seen in several districts in the unprompted recall of more specific advice such as feeding the child out of a separate plate.

However, it is also clear that large proportions of mothers were not receiving comprehensive advice even in Round 3. As the data demonstrate, the proportion of women recalling advice to feed out of a separate plate even in Round 3 was less than 25 percent in all states at the end of the project. Similarly, the proportion of mothers recalling that they had been told to feed the child a variety of foods also remained low overall, with a modest increase of about 20 percentage points in Andhra Pradesh and Orissa.

Associations between reported advice and reported practice

Actual feeding practices, as reported by mothers were observed to be closely associated with reported contact and advice. This is particularly true of at least four to six states in the endline survey. Illustrative examples of observed associations are presented in Table 4.5. For instance, in almost all states, mothers, who reported having been visited at home by either the ANM or the AWW during the last months of pregnancy, were far more likely to have initiated breastfeeding their children within two hours of birth than those who reported not being so visited. Similarly, those who recalled receiving specific advice regarding frequency of feeding complementary foods, were significantly more likely to also report that they fed

[10] Since all women did not report contacts with service providers or volunteers, and since only those who reported contacts could report on advice received, the proportion who received advice is considerably influenced by the proportion contacted.

Table 4.5: **The influence of AWW/ANM contacts and advice provided on feeding practices, Endline (2006)**

	Andhra Pradesh	Chhattis-garh	Jharkhand	Madhya Pradesh	Orissa	Rajasthan	Uttar Pradesh	West Bengal
Home contact by AWW/ANM in last trimester as reported by mothers of 0-5 months old infants born at home								
n[1]	*205*	*429*	*501*	*392*	*565*	*474*	*468*	*396*
% Contacted	80.0	58.0	54.1	44.1	54.0	29.1	57.1	45.9
Initiation of breastfeeding within 2 hours of birth								
% practice amongst contacted	80.5	77.9	68.9	59.2	64.3	43.1	70.8	62.6
% practice amongst not contacted	48.8	68.9	52.8	49.1	47.3	22.6	38.3	53.5
Odds Ratio	4.33	1.59	1.98	1.50	2.00	2.60	3.90	1.46
95% Confidence Interval	1.96-9.59	1.00-2.53	1.35-2.91	0.98-2.31	1.40-2.86	1.66-4.08	2.59-5.89	0.95-2.23
Last month contact by AWW as reported by mothers of 6-23 months old children								
n[2]	*760*	*739*	*645*	*689*	*697*	*679*	*668*	*682*
% Contacted	69.8	61.0	69.0	49.1	58.0	24.0	64.1	54.0
6-8 mo infant fed twice/9-23 months child fed thrice by mother/adult from a separate plate								
% practice amongst contacted	35.5	21.5	24.4	20.9	38.5	7.2	11.1	21.3
% practice amongst not contacted	23.4	14.2	12.6	15.4	28.4	3.3	3.7	21.3
Odds Ratio	1.80	1.65	2.23	1.45	1.58	2.27	3.23	1.00
95% Confidence Interval	1.25-2.60	1.08-2.52	1.35-3.70	0.96-2.20	1.12-2.22	0.99-5.19	1.48-7.27	0.68-1.47
Advice received during the previous month's contact as reported by mothers of children 6-17 months old								
Fed at least the minimum frequency recommended for the age by an adult from a separate plate								
% practice amongst those advised minimum recommended frequency	48.8	36.1	28.1	40.6	57.9	26.8	23.1	31.8
% practice amongst those not advised minimum recommended frequency	26.0	18.6	22.1	23.6	29.5	10.0	10.4	23.2
Odds Ratio	2.71	2.48	1.37	2.21	3.28	1.98	2.59	1.54
95% Confidence Interval	1.96-3.74	1.70-3.62	0.87-2.15	1.49-3.28	2.31-4.68	0.00-9.73	1.64-4.11	1.01-2.35
Fed at least half the quantity of food recommended for the age by mother/adult from a separate plate								
% practice amongst those advised approximate recommended volume	26.1	19.8	33.3	17.7	47.6	8.3	8.9	31.8
% practice amongst those not advised approximate recommended volume	16.9	16.9	18.6	13.9	22.0	4.4	5.2	16.7
Odds Ratio	1.75	1.21	2.19	1.33	3.22	1.98	1.77	2.33
95% Confidence Interval	1.12-2.71	0.63-2.32	1.01-4.71	0.61-2.85	1.79-5.82	0.00-9.73	0.65-4.67	1.10-4.89

n^1 = Total number of mothers of 0-5 months old infants born at home; n^2 = Total number of mothers of 6-23 months old children;
All denominators are not provided here to avoid crowding. They exclude extreme outliers for responses given to questions related to advice and practice of frequency and volumes. In general, the tighter the confidence interval, the larger the denominator.

the child the minimum frequency recommended for the age (as per footnote 5) in six of eight states. Similar associations can be observed between reported advice about minimum needed volumes of complementary foods, and actual volumes fed to children as reported by mothers. Not shown in the table, associations were generally stronger when the feeding practice was defined more specifically or stringently rather than more generally. For instance, the strongest associations with specific advice were seen for the reported practice of feeding three times or more a day than for two times or more a day; or for feeding a certain minimum proportion of recommended volumes of complementary foods than for feeding any amount at all. This makes it more likely that the associations were causal.

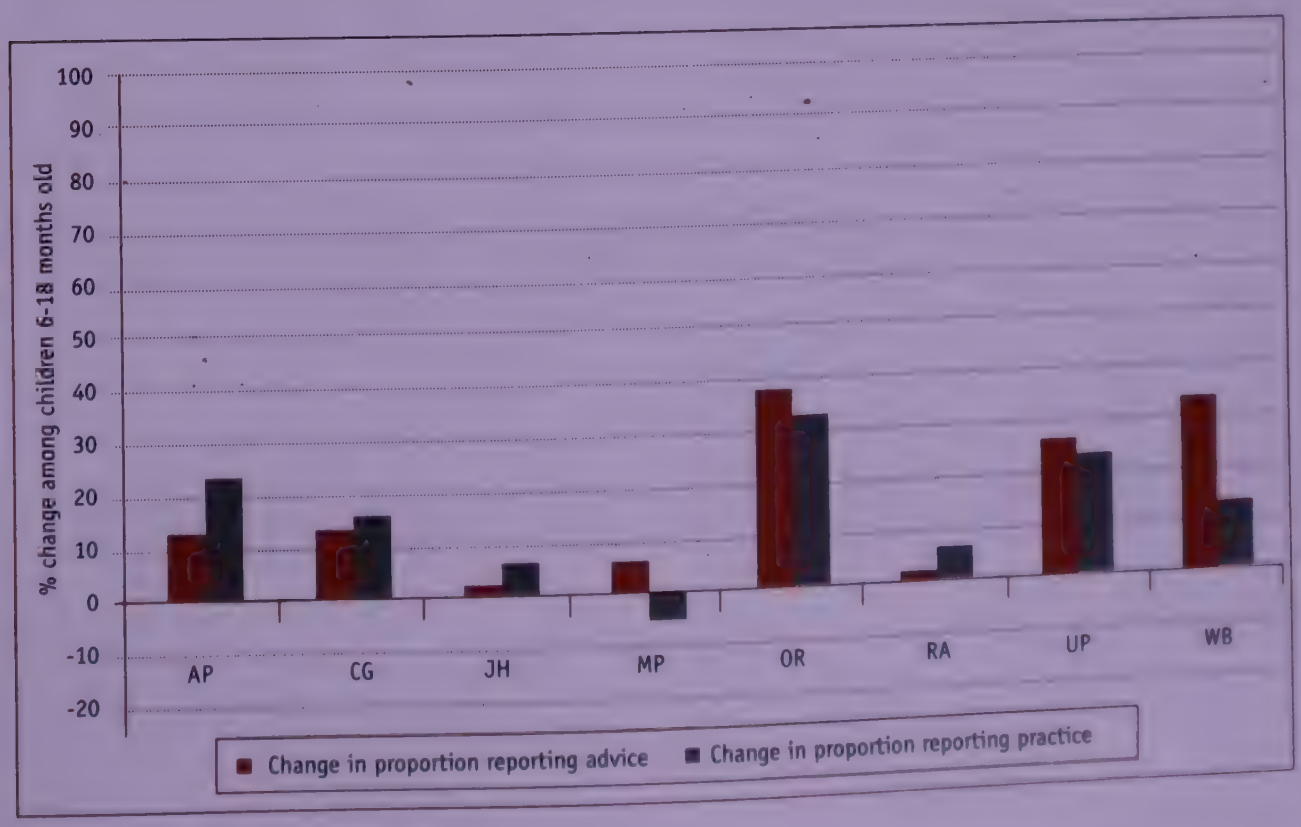
In general, it also appears that in districts where the processes that were promoted did not pick up strongly, the prevalence of desirable feeding practices also did not increase significantly. Figure 4.3 is illustrative of this association: in the panel districts of Jharkhand, Madhya Pradesh and Rajasthan, there was minimal change in the proportion of mothers reporting that they had received advice between Rounds 2 and 3 of RAPs. These were the very districts where change in the corresponding practice (of complementary feeding) was minimal. The strong associations between positive change between received advice and practice in the remaining districts are also clearly seen.

Other aspects of the program strategy, such as the use of multi-channel mass communication for behavior change, and specifically the role of job aids during interpersonal communication could not be assessed because of the lack of measures of such inputs in a form that was amenable to analysis in the same way that contacts and advice were. As stated earlier, mass communication was used primarily to supplement interpersonal communication between service providers or volunteers and families.

Food supplements

The receipt of food supplements from the AWC, an intervention supported by CARE/INHP since decades, was consistently found to be associated strongly with many processes such as home visits by the AWW and the ANM, suggesting that

Figure 4.3: **Comparing change in reported advice related to frequency of complementary feeding and the practice of feeding at the recommended frequency over Rounds 2 and 3 of RAPs in panel districts (2004-2005).**



being a supplementary feeding beneficiary in some way increased the chances of receiving even those services that were not *anganwadi* center-based.[vi] In programmatic terms, it points to the wide influence that ICDS can wield in enhancing reach of health interventions, and thus to the need to strengthen operational linkages between the ICDS and RCH programs. These findings are dealt with in greater detail in the paper, *Changing Infant and Young Child Feeding Behavior*, in this series.

The influence of non-program factors

This section examines the associations between selected process (such as home visits) or outcome (such as feeding practices) variables and variables that the program was not designed to influence, but nevertheless had potential influence on program outcomes (such as socioeconomic characteristics).

Behavior outcomes by background variables

Characteristics such as socioeconomic status, gender/sex of the child, caste, maternal literacy and whether the mother worked outside the home in the previous month were generally not associated with a number of feeding behaviors in the RACHNA endline data (data not shown). This finding is particularly significant, since each of these factors is conventionally considered a powerful influence on infant feeding maybe significant, considering that some of these are conventionally considered important in terms of their influence on child feeding and caring practices.

Table 4.6: **The availability/access gap of selected food groups, children 6-23 months old, Endline (2006)**

Availability of cereals, pulses, vegetables and milk at home in the last seven days								
	Andhra Pradesh	Chhattis-garh	Jharkhand	Madhya Pradesh	Orissa	Rajasthan	Uttar Pradesh	West Bengal
n	*734*	*616*	*576*	*592*	*649*	*487*	*570*	*676*
Cereals								
Cooked on all 7days	93.1	77.1	96.2	78.9	95.4	91.4	86.5	97.2
Cooked on 4-6 days	1.2	4.9	1.6	8.1	1.1	3.1	9.1	1.3
Cooked on 1-3 days	3.5	11.5	1.6	10.6	2.2	4.1	3.7	0.7
Cooked on 0 days	2.2	6.3	0.7	2.4	1.4	1.4	0.7	0.7
Pulses								
Cooked on all 7days	15.1	32.1	27.8	38.2	38.2	6.0	27.5	27.4
Cooked on 4-6 days	18.1	17.0	22.0	15.9	12.2	11.3	23.2	13.8
Cooked on 1-3 days	60.2	38.1	42.7	38.9	33.7	57.9	37.9	41.1
Cooked on 0 days	6.5	12.7	7.5	7.1	15.9	24.8	11.4	17.8
Vegetables								
Cooked on all 7days	20.4	59.1	61.1	60.8	57.9	59.5	64.4	71.9
Cooked on 4-6 days	35.1	14.0	20.8	13.9	11.9	24.6	22.3	10.5
Cooked on 1-3 days	40.3	16.2	15.8	19.1	18.0	11.7	11.1	14.3
Cooked on 0 days	4.1	10.7	2.3	6.3	12.2	4.1	2.3	3.3
Milk								
Available 7 days	52.9	12.0	19.8	29.2	12.8	88.9	61.1	32.0
Available 4-6 days	4.4	1.9	2.6	2.9	0.6	1.8	8.9	3.4
Available 1-3 days	13.9	17.4	6.1	9.3	5.5	2.5	6.8	11.4
Available 0 days	28.9	68.5	71.5	58.6	81.0	6.8	23.2	53.3

n = Families where the index child has started complementary feeding

Differential reach of program processes

One persisting concern for all public health programs is whether planned interventions reach the less privileged sections of the target communities. The endline survey examined the reach of interventions to those who were economically disadvantaged and to families at different distances from the *anganwadi* center as presented in Table 4.6. There was no consistent direction of association between two halves of a socioeconomic score (SES),[11] and whether or not the respondent reported a home visit. However, the location of the respondent's home (in the same hamlet as the AWC or elsewhere) appears to have had a predictable but modest bearing on whether the respondent was likely to receive a home visit from the service providers: in about half of the states, respondents living closer to the AWC were somewhat more likely to get the visit than the more distant ones (data not shown).

Food security: availability vs consumption of selected food groups

A major concern in the context of malnutrition is the influence of food insecurity, particularly availability of, and access to, nutrients. INHP-II did not address issues related to food production and distribution, but the interventions did include educating mothers about the utilization of a variety of foods and quantities at appropriate ages. A series of questions related to availability at home of foods belonging to different food groups were asked to all mothers of children 6-23 months of age, along with questions about the foods being given to children over 24-hour and 7-day recall periods. This makes it possible to obtain a measure of the availability of each food group in individual homes and the gap between the availability of a food item at home and the practice of feeding that food item to the child. This analysis is presented in Table 4.7.

The availability or access gap: The staple cereal (rice/*roti*/*khichdi*) was available in most of the households surveyed, on most days.[vii] However, milk and milk products were not available in all households, with Orissa reporting the lowest availability of milk (20 percent). Pulses and vegetables were cooked about half of the time in households surveyed. Families with illiterate mothers and families with a relatively low SE score were less likely to report having milk products and pulses available (data not presented).

The utilization gap: In three states, less than 10 percent of families reported not giving cereals to children on one or more days, even when available. In the remaining five states, this gap ranged from 13 percent to 23 percent on one or more days in the week. In up to five percent of families in Uttar Pradesh and West Bengal, children 6-23 months old were not fed cereals on a single day in the past seven even when cereal was available daily. In up to 25 percent of households, children were not fed vegetables on any day, even when available in the house, and up to 40 percent were not given milk even when available. Further analysis (also not shown in tables) indicates that the patterns are not substantially different for younger or older

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[11] Socioeconomic Score (SES): The variables included in the socioeconomic score are caste, maternal education, maternal employment, type of housing, access to toilet facilities, electricity and potable water. A score of zero or one was assigned to each respondent for each variable and the sum of these scores formed the SES score for a given respondent. The sample was split into approximately equal halves at a cut-off score closest to the median, to give two relative groups on either side of the median. This was done for each state, and separately for baseline and endline data sets. The method is described in greater detail in the paper, *Methods Used for Assessments*.

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Table 4.7: **The utilization gap of selected food groups, children 6-23 months old, Endline (2006)**

Difference between the number of days specific food groups were available at home vs the number of days consumed by the child in the previous seven days								
Utilization gap	**Andhra Pradesh**	**Chhattis-garh**	**Jharkhand**	**Madhya Pradesh**	**Orissa**	**Rajasthan**	**Uttar Pradesh**	**West Bengal**
n	*718*	*577*	*572*	*578*	*640*	*480*	*566*	*671*
Cereals								
0 days	90.7	79.5	92.0	76.5	91.1	76.7	75.1	85.8
1-3 days	3.3	8.7	3.8	9.7	2.8	9.4	11.7	5.4
4-6 days	2.5	5.5	2.4	8.8	2.5	7.7	9.2	3.6
7 days	1.8	1.4	1.2	1.2	2.5	4.4	2.3	4.5
Borrowed	1.7	4.9	0.5	3.8	1.1	1.9	1.8	0.7
n	*686*	*538*	*533*	*550*	*546*	*366*	*505*	*556*
Pulses								
0 days	68.7	76.8	87.8	74.4	87.2	48.4	70.1	74.3
1-3 days	20.8	12.8	8.4	13.6	6.2	38.8	21.0	15.1
4-6 days	2.8	3.9	2.1	8.2	3.5	7.9	6.1	4.1
7 days	2.2	1.9	0.9	1.1	1.6	3.3	1.4	3.2
Borrowed	5.5	4.6	0.8	2.7	1.5	1.6	1.4	3.2
n	*704*	*550*	*563*	*555*	*570*	*467*	*557*	*654*
Vegetables								
0 days	63.8	61.6	81.7	54.6	84.2	36.4	53.7	71.4
1-3 days	20.6	9.5	4.6	13.3	7.4	14.8	16.0	11.5
4-6 days	9.8	10.2	5.7	13.2	3.5	21:6	19.6	7.4
7 days	3.4	15.3	6.6	16.9	4.0	26.3	9.3	9.2
Borrowed	2.4	3.5	1.4	2.0	0.9	0.9	1.4	0.5
n	*522*	*194*	*164*	*245*	*123*	*454*	*438*	*316*
Milk								
0 days	59.2	50.0	75.6	62.0	67.5	77.3	66.9	82.0
1-3 days	11.7	22.7	9.1	14.3	13.8	4.4	11.2	7.6
4-6 days	11.3	5.2	6.1	8.6	4.9	7.9	8.4	3.5
7 days	15.3	12.9	7.3	11.0	11.4	9.3	11.9	4.7
Borrowed	2.5	9.3	1.8	4.1	2.4	1.1	1.6	2.2

n = Families where mothers report that the food item was available in the past seven days

children within the 6-23 months age group. Thus, utilization gaps for these food groups apparently remain relatively constant even as the child grows older across this age range. No clear differences were observed between different socioeconomic groups in terms of the utilization gap.

In sum, the lack of pulses, vegetables and milk products in many households presents a genuine food security problem. Beyond this, there are significant gaps in the utilization of available foods for child feeding in the case of four important food groups. Taken together with the very small quantities of meals given to children, this amounts to massive failure of infant feeding. The silver lining lies in the findings presented earlier, which indicate that focused program interventions can improve infant feeding practices at large scale over relatively short periods, addressing the utilization gap.

Improving Infant Feeding Over the Life of RACHNA: Lessons from the Field

Lessons related to strengthening program operations

Apart from the empirical evidence discussed above, there was a wealth of information and lessons from the field, starting with the lessons learned during INHP-I. These lessons informed periodic refinements to the strategy, a process that has been detailed in several other papers in this series.[12] In brief, what emerged as the most likely to bring about behavior change at large scale during the INHP-II project period was a set of interlinked strategies seeking to strengthen interpersonal communication between frontline ICDS or RCH workers and the families of pregnant women and children under two years. Results, as presented above, indicate that these strategies did succeed in improving key processes and outcomes in different contexts. This section lays out some of the background specific to infant feeding, which should help the reader appreciate more completely the nature of the change that was attempted.

In the first year of INHP-II, a number of elements of the original operational strategy were sought to be rapidly implemented in about 100 selected AWC clustered in a few districts in each state, to help draw lessons about operational feasibility and effectiveness that would inform the larger program.[13] When these sites were evaluated in mid-2003, some important lessons relevant to infant feeding were learnt:

- The 6-12 months of intervention appeared to have brought about modest changes in infant feeding practices; qualitative assessments indicated, however, that amounts of complementary foods fed to infants were very small.
- Information about feeding practices was reaching more families through community volunteers, AWW and ANM; however, there was little evidence of any serious effort to identify and address specific cultural and social barriers to adequate infant feeding.
- There appeared to be associations between families reporting contacts with such volunteers or functionaries and the reporting of good feeding practices.
- The enthusiasm and efforts of community volunteers in these early learning sites were remarkable; it was clear, however, that this was being sustained by intense contact with staff of contracted NGOs and CARE district teams, and it was not clear if this in itself was replicable at wider scale.

As a response to these findings, an "Essential Nutrition Actions" package which consisted of age specific feeding recommendations, job-aids and guidelines for implementation of nutrition interventions at village, sector, block and district levels, was developed to demystify and strengthen the nutrition component of the program. The package included a simplified approach to counseling for adequate infant feeding. This package was field tested at multiple sites with close

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[12] The paper, *Program Description* provides an overview of the original operational strategy and the refinements that were made; the paper, *Working with Existing Systems* provides further details of the lessons that led to specific changes in approaches to working with ICDS and RCH; the paper, *The Role of Community Volunteers in INHP*, provides descriptions of lessons learnt while implementing the strategy of establishing and sustaining a cadre of community volunteers.

[13] The paper, *Program Description* provides details of the learning process involving these Early Learning Sites.

participation of CARE field teams as well as ICDS and health functionaries, before being offered for larger scale implementation. Other elements of the BCC strategy were also strengthened.

It also became increasingly obvious that the lack of effort in the ICDS and health program functionaries had deep roots:

- "Malnutrition", in common ICDS parlance, referred only to the most severely malnourished children – the Grade III and IV of ICDS growth charts, usually less than five percent of the children registered at the *anganwadi* center. The established interventions for addressing malnutrition were the different kinds of referral care and extra food supplements provided to such children. Most of the special efforts and campaigns that states launched periodically focused virtually exclusively on these children. The numbers of such "malnourished children" were tracked assiduously (based on routine monthly reports from AWW) at the highest administrative levels. However, the huge numbers of children of lesser degrees of malnutrition received almost no special attention.

- Any focus on preventing malnutrition was almost entirely missing. Field staff and program leadership did not reinforce or emphasize breastfeeding or complementary feeding practices during their visits to *anganwadi* centers. There was inadequate appreciation of the fact that child feeding after three years of age was of little consequence to child malnutrition, and that insufficient attention to infant feeding was a major cause of the high levels of malnutrition.

- There was limited understanding of malnutrition among medical and nursing staff of the health department. While it was known in principle that malnutrition worsened by about six months of age when breast milk alone became inadequate, the extent of the problem was not recognized.

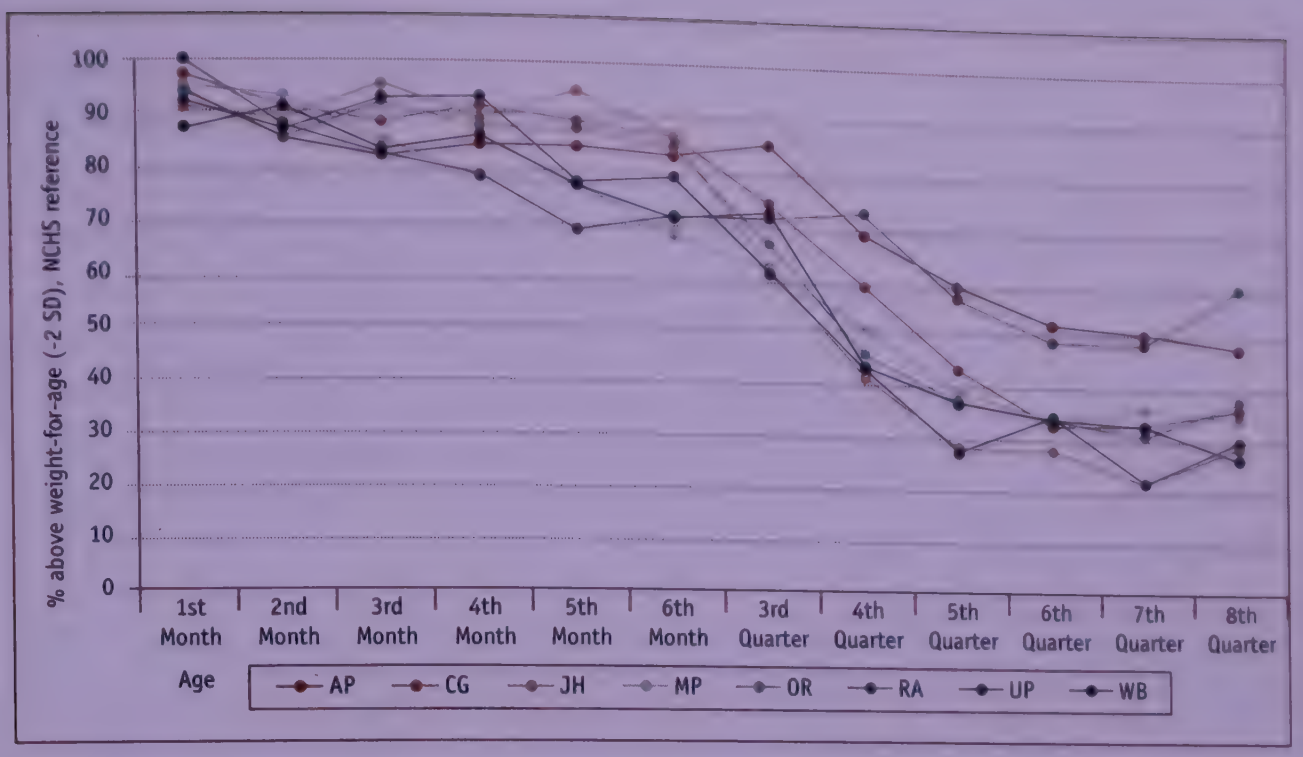
- There was almost no source of evidence to show the status of feeding behaviors or of the processes that were meant to address feeding behaviors. Routine records and reports gathered virtually no information, and most surveys, including the NFHS and RHS gathered only the most rudimentary information on feeding behaviors. By default, this permitted neglect of feeding behaviors.

- At all levels, there appeared to be acceptance that malnutrition was a direct consequence of poverty and nothing could be done about it.

Between 2002 and 2005, INHP-II sought to increase the focus of ICDS and health programs on the prevention of malnutrition, using evidence from within and beyond the project, and commonsensical reasoning to demonstrate why it made sense to pay attention to changing feeding behaviors. Specific points that were made include:

- Mild malnutrition contributes to more deaths than severe malnutrition. Simple calculations, based on known proportions of children in different grades of malnutrition, and known mortality rates in these groups, were used to show how this happened.

Figure 4.4: **Trends of proportion of normally nourished children across eight states in the first two years of life, NCHS standards. Data from RAP Round 2 (2004).**



- Malnutrition in children begins early and is well-established well before the child is two years old. Evidence from surveys such as the RAPs were used to show how malnutrition rates increase dramatically after about six months of age and touch 60-80 percent in the second year (Figure 4.4).[14] While malnutrition rates are lower among children from better-off families, they too were not growing to potential.[15]

- Most children are not fed complementary foods (cereal-based semi-solid or solids) in quantities anywhere close to the amounts recommended for their age. This is irrespective of socioeconomic status, and is related to poor awareness of the fact that children 6-23 months old would eat substantial amount of such foods, if offered.

- Very few mothers actually ever receive advice from service providers about infant feeding.

Such evidence and reasoning was used to persuade program leadership at various levels to act. Although this was not a uniformly intensive process, most districts did acquire at least a minimal level of focus on infant feeding by the end of the project period. In many of the districts evidence was gathered and used resulting in a series of actions within ICDS and health programs and leading to improvements in process and outcome indicators.[16] Informal assessments in the field indicated a strong association between purposive actions by INHP teams (to advocate for operational focus on infant feeding and to provide hands-on guidance to field functionaries for establishing and sustaining such focus) and such changes. Where either the effort by the INHP teams or the "absorption" by ICDS and health field staff was not sufficiently effective, the changes in process and outcome indicators appeared to be proportionately less strong.

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[14] Part of the reason for the dramatic fall in nutritional status from late in the first year until late in the second year is the use of NCHS standards. When the new WHO Child Growth Standards are applied, the fall is less dramatic, although the pattern remains the same. See Shrimpton, R et al, 2001.

[15] Typically, in communities across districts and states it is uncommon to find children who are growing near or above the median of NCHS standards for that age (or well above the uppermost curve of the ICDS growth charts).

[16] The RAPs and the Evaluation Research study were serial, independently conducted district level household surveys covering 10 districts in all. In addition, over 50 other districts conducted one round of smaller, locally-led and managed assessments (usually called "mini-RAPs") sometime in 2004 or 2005.

Another important lesson learnt concerned the primary vehicle for interpersonal communication. Change Agents, who were village volunteers supported by the AWW and ANM, were identified at the beginning on INHP-II as key persons responsible for operationalizing behavior change for IYCF at the village and household level. However, it had become obvious by the mid-term review that, in most districts, very few mothers reported that they were being contacted by Change Agents (RAP, Round 2, late 2004). It became apparent that Change Agents were working well when well-supported, either by NGO field staff or by a capable AWW, but this was restricted to relatively few sites, and the time and intensity of effort needed to make this work at larger scale was deemed beyond the scope of INHP-II.[17]

In contrast, increasing proportions of mothers reported in many states that they were being contacted by AWW and ANM at critical points during pregnancy and infancy. These home visits provided contextual guidance to families on infant feeding, and the personalization made a difference. Simple calculations showed that it took about 1-2 home visits a day for the AWW to accomplish the minimum number of visits to homes of children and mothers to provide timely information and advice on newborn care and infant feeding. This was well within the 5-home-visits-a-day norm that the AWW were supposed to follow according to their job description. ANMs could supplement this effort by making similar home-visits whenever they visited the village. The role of the Change Agents was therefore also modified with lesser expectations of contributing significantly to behavior change efforts.

In addition to the recruitment and role of community volunteers (Change Agents), a wide range of other approaches were used in different contexts during INHP-II to enhance community involvement and participation in sustaining behavior change. This included the encouragement of appropriate local belief systems (such as the ritual initiation of complementary feeding at the age of six months), the use of ritual events to initiate meaningful behavior change (such as turning the ritual *god bharai* – traditionally conducted in the seventh month of pregnancy to invoke blessings for the impending childbirth – into a larger community event designed to enhance awareness and involvement of the family and community in ensuring a safe childbirth and perinatal care) or creating community platforms where social barriers to the practice of desirable behaviors could be discussed (such as initiating *saas-bahu-pati-sammelan* – gathering of mothers-in-law, daughters-in-law and husbands where their mutual roles in mother and child care could be discussed) or the use of formal community platforms such as the *Gram Sabha* or *Panchayat* bodies or women's self-help groups to raise the collective consciousness of the state of nutrition of mothers and children and to support the AWW, ANM and Change Agents in their efforts to improve service coverage and change child caring and feeding practices. All such processes shared the strengths and limitations observed in the case of Change Agents: when intensely implemented, they were effective; intensity in implementation was difficult to sustain at larger scale.

[17] See paper, *The Role of Community Volunteers in INHP*, in this series.

Such community-level efforts complemented mass communication efforts, which were based on state-specific behavior change communication strategies. These were developed in most states in consultation with other agencies that used public space to address similar issues as INHP-II, and with the involvement of government departments. The idea was to minimize conflict and confusion between channels carrying messages about child caring and feeding, and to leverage and optimize existing resources. The channels of communication used included folk theatre and community events, posters, banners, wall writings and radio spots and programs. These reached peak intensity at different periods of time, and each of them achieved variable penetration. No formal assessment of the reach and effectiveness of these measures was conducted. However, it was clear that such channels of communication reached a general audience and that it was interpersonal communication that was more suited to take the right information to the right person at the right time in the context of a time-bound effort at behavior change.

As a result of lessons learned from all of efforts described above, a number of modifications were made to INHP-II in early 2005 to reorganize the strategy[18] and address scale and effectiveness simultaneously. The AWW's daily diary was converted into a home-visit planner-register to help her track her own home visits and caring and feeding behaviors of individual mothers and children from pregnancy through to the second year of the child's age. ICDS sector meetings[19] were reorganized to allow structured time for sufficient discussion of outcome-oriented activities (besides the administrative tasks). Guideline checklists were given to ICDS supervisors to help them ask the right questions to AWW during meetings and field visits, so that they could intervene in a timely manner and help the AWW guide behavior change in families. The active and regular participation of ANMs was sought in ICDS sector meetings, besides active participation in the monthly Nutrition and Health Day to provide fixed-day fixed-site services as earlier. Representatives of locally contracted NGOs (one per block) and INHP district team members (typically, 2-3 per district) facilitated and supported these processes. While many of the community processes described above continued to be promoted, it was difficult to sustain the necessary intensity at the full project scale within the life of the project.

The speed and intensity with which these described developments were understood, taken up and implemented varied by state and often by district within a state. Some of the panel districts where RAPs were conducted, for instance, had adopted many elements of this strategy as early as 2004, while these were not implemented intensely enough in several other districts. This differing intensity appeared to be one of the main explanatory influences that produced differential results. The endline survey results discussed earlier in this paper are thus state-level summated averages of the influence of different durations and intensities of implementation.

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[18] The changes that were introduced into the strategy in the last year of the program as it went to full scale, the development of these tools and processes, and the extent of their penetration are described in detail in the paper, *Working with Systems and Program Description*.

[19] The area of operation of a field supervisor of ICDS (also called Lady Supervisor or *Mukhya Sevika*) is called a sector and typically covers about 20-25 AWC. At monthly sector meetings, all AWW in the sector meet with the supervisor to submit monthly reports and plan for the subsequent month.

Box 4.2: INHP-II Interventions and improvements in nutritional status: An analysis from Kalahandi district, Orissa, Rounds 2 and 3, RAPs

Between the RAPs Rounds 2 and 3, a number of closely related improvements were observed in the panel district in Orissa – Kalahandi, with respect to infant feeding and nutritional status in the age group 6-11 months. The analysis below demonstrates relationships between: (a) increased service provider contacts with caregivers; (b) the advice that caregivers report that they received at visits; (c) infant/child feeding behaviors; and (d) nutritional status.

Changes in nutritional status

Table 1 shows that nutritional status (weight-for-age) among infants 6-11 months of age in Orissa Panel District improved from Round 2 to Round 3 according to several measures. Mean Weight for Age Z score (WAZ) increased by more than a quarter of a Z-score and the percentage of infants who were severely malnourished dropped by half.

Table 1. Nutritional status (weight-for-age) among infants 6-11 months of age

Indicator	Round 2	Round 3	Difference	p
Mean WAZ (SD)	-1.795 (1.1577)	-1.526 (1.0814)	0.270	0.037
Severe Malnutrition %	14.6	7.6	-7.0	0.055
Moderate Malnutrition %	27.8	21.4	-6.4	0.192

Changes in feeding-related behaviors reported by caregivers

Table 2 shows that, on average, at Round 3, caregivers reported feeding 1.28 more meals/day and 80 ml more food/day than at Round 2. From Round 2 to Round 3, the percentage of caregivers introducing semi-solid foods during the sixth month (not earlier than six months and not later than the sixth month) increased by more than 11 percentage points.

Table 2. Feeding-related behaviors reported by caregivers of infants 6-11 months of age

Indicator	Round 2	Round 3	Difference	p
Mean frequency of meals/day*	1.45	2.73	1.28	0.000
Mean quantity (ml) food per meal (SD)	101.5 (65.91)	181.4 (116.36)	79.9	0.000

* Fed by caregiver or family member from separate bowl or plate.

Associations between targeted feeding behaviors and nutritional status

INHP-II targeted increased frequency and quantity of feeding as key behaviors influencing infant/child nutritional status. Caregiver-reported frequency of meals fed per day and quantity of food fed per day were regressed on WAZ of infants 6-11 months of age to test whether this assumption is correct. The analysis demonstrated that these behaviors are strongly associated with weight-for-age (Table 3): a 0.137 Z-score increase in WAZ is associated with each additional meal per day, and a 0.002 Z-score increase in WAZ is associated with each additional milliliter of food per day (or a 0.200 WAZ increase for every additional 100 ml/day).

Table 3. Linear regression coefficients for caregiver-reported feeding behaviors in the prediction of weight-for-age among 6-11 month-old infants (RAPS Round 2 and 3 combined)

Factor	β (SE)	p
Frequency of meals/day*	0.137 (0.049)	0.005
Quantity of food/day (ml)	0.002 (0.001)	0.021

* Fed by caregiver or family member from separate bowl or plate.

Associations between targeted feeding behaviors and AWW/ANM contacts, and advice received at those contacts

Strong associations were observed between contacts with caregivers in the previous month and the frequency of meals fed per day, but no statistically significant relationship was observed between contacts and quantity of food

fed per day (data not shown). Mean frequency of feedings/day was 0.5 feeding/day higher among those who had a contact with an AWW during the previous month than among those who did not report such a contact. Although quantity of food fed per day was not statistically associated with contacts with AWWs or ANMs, the observed mean effect was positive.

Both frequency and amount of food were strongly and positively associated with the recommendation that caregivers received: as shown in Table 4, for each increase in recommended feeds per day frequency of meals fed increased by more than half a meal, and the amount of food fed per day increased by nearly 40 ml.

Table 4. Linear regression coefficients for advice received during contacts with service providers in the prediction of feeding behaviors among caregivers of 6-11 month-old infants (RAPs 2 and 3 combined)

Reported behavior	Advice	β (SE)	p
Frequency of meals fed per day	No. of feeds/day	0.544 (0.131)	0.000
Amount of food fed per day (ml)	No. of feeds/day	36.7 (13.38)	0.007

Changes in caregivers reporting contacts with service providers and reporting receiving specific advice related to infant/child feeding

Table 5 shows very substantial increases in the percentage of caregivers who report receiving a visit from the AWW or ANM in the previous month. Table 6 shows an equally and correspondingly substantial increase in the percentage of providers who reported receiving advice related to feeding staple foods. Among caregivers who received this advice, the mean number of daily feeds recommended to them also increased substantially from Round 2 to Round 3.

Table 5. Percentage of caregivers reporting contacts with AWWs and ANMs in the month prior to the survey

Contact	Round 2	Round 3	Difference	p
With AWW in previous month	60.8	82.1	21.3	0.000
With ANM in previous month	30.4	63.4	33.0	0.000

Table 6. Percentage of caregivers reporting advice about infant/child feeding during contact with service providers during the month prior to the RAPs survey

Indicator	Round 2	Round 3	Difference	p
Feed staple foods (%)	33.7	77.9	44.2	0.000
Mean recommended daily feeds (SD)*	2.4 (0.78)	3.0 (0.82)	0.6	0.001

* Among those advised to feed staple foods.

Conclusion

Without random assignment of individuals to intervention and control groups, certain attribution of observed results to an intervention is not possible. Nonetheless, several factors suggest that INHP-II interventions to increase service provider contacts with caregivers, and to improve the quality of advice given at those contacts, have resulted in substantial improvements in nutritional status. First, service provider contacts and advice given at contacts have clearly improved from Rounds 2 to 3 in Orissa Panel District. Second, both contacts and advice are associated with the practice of behaviors targeted by the project. Third, the percentage of mothers practicing the targeted feeding behaviors increased dramatically during the same period. Finally, empirical evidence demonstrates that the targeted behaviors are strongly associated with nutritional status, which has improved markedly from Round 2 to Round 3.

Lessons related to behavior change

From interactions with field teams and from field visits, and correlating these with survey data, some lessons could be drawn. Broadly, they were:

- Feeding practices around the neonatal period (early breastfeeding, avoidance of prelacteals) were adopted quickly – sometimes dramatically so.

- Not all practices changed so easily, for example the timely initiation of complementary feeding. This was despite considerable emphasis on this practice throughout the life of the program, and despite an established tradition of ritual initiation of feeding of cereals at the age of around six months in most communities. The practice of the rituals was strengthened over time, but, the intense effort required to sustain complementary feeding in the weeks and months beyond the ritual was harder to sustain. The resistance to change came from the perceived intensity of effort needed and the lack of perceived need for complementary feeding.

- Anecdotal evidence suggests that information reaching families from multiple channels is important, and that personalization of advice by the AWW or ANM is crucial. Families do recall "messages" heard on the radio or TV, but do not seem to associate them with their own practices until someone makes the association for them.

- Behaviors that changed quickly, changed apparently without intensive, specialized counseling. Such intense counseling was in any case not feasible to ensure at large scale over a short period of time. This indicates that an approach of tailoring intensity of behavior change efforts to the levels of readiness to change may prove more efficient than attempting equally intense efforts for all behaviors in all contexts.

The impact of INHP-II on child malnutrition

The project had targeted an eight percentage point decrease in the proportion of malnourished children among 12-23 months olds over the five project years, and this was expected to be assessed by making a comparison of this indicator between baseline and endline surveys at the aggregate program level. A reduction of approximately eight percentage points was actually observed over this time period, between the baseline and endline surveys. However, attribution of this change to INHP measures is difficult, and the Final Evaluation of the project speculated that, given the fact that no significant change in nutritional status was observed in the evaluation research study, and since the relatively modest increments in feeding practices were unlikely to have influenced nutritional status at a program level, the reduction in levels of malnutrition between the baseline and the endline might be attributable to the increase in measles vaccine coverage rates over the same period.

Apart from the nutrition evaluation research study that was conducted in two intervention districts, there is no other source of data from intervention and comparison areas. However, serial assessments made through the RAPs permit analysis of a number of process and outcome variables that INHP tried to influence using such periodically collected cross-sectional data. Among all districts and age groups examined, strong associations emerged in the panel district in Orissa, Kalahandi, in the age group 6-11 months. A detailed case study is presented in the Box 4.2, which suggests that there exists a high probability

that nutritional status improved as a consequence of better complementary feeding, promoted in turn by home visits and advice given to families of these children by AWW and ANM. Some of the largest improvements in process and feeding practice indicators were seen in Kalahandi, among all the panel districts. This may be interpreted to mean that, where the processes of timely home visits and advice were seriously and extensively implemented, they probably led to better feeding practices and to better nutritional status among children in the district. The sample in Kalahandi represented a universe of 263 AWC, a large scale. Equally strong and consistent associations were not found in other panel districts, but these results raise the possibility that a certain proportion of the 78 project districts did achieve a focus of sufficient intensity during the project period to have begun to move nutritional status. It is tempting to believe that given more implementation time, more districts may have achieved similar implementation intensity and achieved similar results in terms of nutritional status.

Conclusions

The INHP attempted to promote healthy infant and young child feeding behaviors on a large scale, using a number of different strategic approaches, as one of a set of interventions aimed at reducing mortality and malnutrition in children. The most widely applied approach was to help the ICDS program, and to a lesser extent, the RCH program sharpen their focus on families with children less than two years of age to promote healthy feeding practices. A number of other approaches, including mobilizing and training community volunteers, mass communication and the involvement of community groups in monitoring services were also employed, but less widely. This paper has presented the results and lessons emerging from this experience.

INHP intended to help improve a wide range of breastfeeding and complementary feeding practices, but narrowed the emphasis over time to cover the more basic ones to begin with. The evidence presented suggests that almost all feeding practices improved at scale, although not across all areas. The evidence also indicates that activities and processes promoted by INHP, that is, timely home visits with key messages and advice related to infant feeding during pregnancy and at critical contact points early in the first two years after birth improved significantly over time, and that these improvements were generally more marked in the same districts or states that saw improvements in feeding practices. Also, at least in the case of some feeding practices, strong associations were found with reported contacts and advice given by service providers. Finally, there is a specificity to certain changes that suggests the influence of INHP. For instance, over the three rounds of RAPs, there is an increase in the reported frequency of feeds given by adults out of a separate bowl or plate, but in most districts, this is not accompanied by an increase in frequency of meals fed by young siblings, or by the child himself, or in the proportion of infants fed out of someone else's plate – either of which should logically have increased as part of a "secular" trend.

Evidence of success in promoting breastfeeding practices through timely and repeated contacts by peer and professional counselors in community settings are

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available from other regions of the world as well (Morrow et al, 1999 and Sikoriski et al, 2002). These findings suggest that the differential pace of change in a given outcome indicator in different contexts could be a function of the intensity with which these process were applied in different contexts. Field observations made by project staff corroborate this explanation. It could happen that, over a longer period of implementation, as field teams learn from experience, the pace of change could become more uniform across contexts. Cultural factors, where strong, can be expected to modulate the effect of such efforts. The differences in exclusive breastfeeding rates between different states, and in their rate of change are probably good examples of differences in the strength of traditions governing feeding water or other liquids in the first six months.

There are several possible explanations for the large differences in the pace of change of neonatal vs post-neonatal feeding practices. Immediate breastfeeding and the avoidance of prelacteals are one-time behaviors, and thus easier to change than behaviors such as exclusive breastfeeding or sustained complementary feeding, which require continual efforts on the part of mothers. There is an operational explanation as well: both ICDS and RCH programs focused more on pregnant women and childbirth rather than the older infant and child. Even when such attention was given, it was primarily for immunization, not infant feeding. INHP field teams believe that, more intensive attention to infant feeding, particularly complementary feeding, could have increased with time. This becomes very pertinent when one considers that, by design, INHP reached the last half of the program universe in the last year of the five-year time-frame. Finally, "messages" for complementary feeding tend to be more complex and possibly require more skill for effective communication. The improvement in frequencies and quantities of complementary foods in areas where it did improve, such as in Orissa, could probably be a result of more focused capacity building of service providers with well defined information. Feedback from government functionaries suggest that age specific feeding recommendations and simple job aids of the essential nutrition actions package described earlier facilitated this change process.

The achieved rates in the quantities of complementary feeds fed to children are disappointing, particularly when compared to what children at that age should have eaten to sustain adequate growth. However, this must also be judged from the fact that complementary feeding of any significant amounts was virtually non-existent in this age group across most states even as late as 2003, when the first round of RAPs were conducted, and if these values are taken as representative of practices in most communities in the states, the values from the third round in 2005, and from the endline for the states in 2006 (not presented in the paper, since there were no baseline values to compare with, but similar to the values in the third round of RAPs) begin to look respectable.

The influence of INHP interventions on malnutrition rates is difficult to judge on the strength of the available evidence. At program level, malnutrition rates fell eight percentage points between the baseline and endline surveys, but the nutrition evaluation research study failed to find a difference in nutritional status between intervention and comparison districts after two years of intervention. On the other hand, as the case study from Kalahandi in Orissa suggests, there could be pockets

of rapid improvement in feeding practices and also nutritional status. Recent smaller studies in India, as quoted earlier, improvements in feeding behaviors did not lead to discernible improvements in weight-for-age status, and it is possible that change in a number of other factors (infections, micronutrient deficiencies, food availability, etc) will be required to mediate a change in nutritional status in all contexts. What is certain, however, is that improvements in nutritional status will be impossible to achieve with the low absolute levels of feeding practices, particularly complementary feeding, that the INHP experience has documented.

In sum, there are two heartening conclusions that can be drawn on the basis of the INHP experience:

- Infant and young child feeding practices can change at large scale, and change relatively quickly and measurably.
- Such changes can be brought about largely though the efforts by existing national programs, the ICDS and RCH, without major additional resources.

Promoting infant and young child feeding has always been a mandate for both the ICDS and the RCH programs, and as described in the paper and documented extensively elsewhere, this has always received insufficient operational attention. There are no ready delivery systems that can carry infant feeding interventions to the homes of millions of families as readily as these two programs can, and it is imperative that they are strengthened to achieve this mandate. The experience described in this paper indicates that these programs have shown that they can effectively change feeding practices through focused effort. Shorn of detail, what appears to have primarily worked in these areas is the timely carrying of simple "messages" about infant feeding to mothers and families of children under the age of two years by AWW and ANM, the frontline workers of these programs, with oversight from their supervisors, NGOs and INHP field teams. Other measures, such as additional resources for behavior change communication, can, by implication, strengthen this further.

The role of INHP has been that of a catalyst, reminding and guiding, at managerial and operational levels, at an incremental cost that is a small fraction of the total cost of running ICDS and RCH. A base has been established, on which further efforts towards reductions in malnutrition can be built.

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Endnotes

i. While the endline follows the current standard of asking mothers a series of prompted questions listing several possible liquids that might have been given, the baseline uses a similar list, but does not prompt for each option. Effectively, the baseline values for the 24-hour EBF indicator are likely to be over-estimates, and this would tend to underestimate improvements from baseline to endline. Another difference between the questions in the two surveys is that medicines are prompted for in the endline but not in the baseline. This might have affected comparisons since medicines are excluded from the definition of EBF. However, since the proportion of respondents reporting "other" liquids or solids in the baseline is very small across all states (and lesser than the "others" in endline), it is unlikely that medicines have been considered by the interviewers and respondents at the baseline, and thus it is unlikely that the baseline EBF estimates have been affected by the absence of medicines in the list.

ii. Only cereal-based semi-solid or soft foods like rice, mashed *roti* or *khichdi*, with or without vegetables, meat, fish, eggs were included in the estimation. Only meals fed by an adult or a sibling older than 12 years, out of a separate plate or bowl, were included. First, the mother was asked to recall the number of times the child was fed such foods in the previous 24 hours, by different persons, including the child himself or herself, out of a separate plate or bowl. The mother was requested to get the bowl or plate that she normally used to feed the child, along with some water in a separate glass/jar. She was then requested to estimate the quantity eaten by the child during each meal fed by an adult or sibling older than 12 years of age, by pouring the corresponding amount of water into the bowl. Any amount not eaten by the child was discarded. The water was transferred into a measuring cylinder. This process was repeated for each meal and the amount eaten throughout the day was noted in milliliters. The energy density of cereal-based semi-solid was assumed to be similar to that of cooked rice, which was assumed to be 1 kcal per gram (a conservative estimate), and the physical density to be 1 gram per milliliter; thus, the volume of semi-solid measured in milliliters was numerically equivalent to the number of kcal consumed.

iii. Approximations are available for the second and third rounds of RAPs for intake not quantified in these estimates:

- Meals fed by the child himself/herself, or by another child less than 12 years old: Among infants, less than 15 percent of children were reported to have been fed this way across districts and rounds, and there was no significant change in this proportion across rounds. Among children 12 months or older, this proportion ranged from 1 percent to 43 percent, but there was insignificant change over rounds in most cases.
- Meals fed out of someone else's plate: about 30 percent to 90 percent of infants and children were reported to have been fed out someone else's plate across rounds, but again, there is insignificant change over time in this proportion in most districts. Field observations indicate that, while this proportion is indeed high, the actual quantities fed are often very small.
- Snacks other than meals: The proportion of children reported to have been given snacks was in the range of 30 percent to 80 percent, with a small increase with age, but there was no significant change in this proportion across most districts.

Thus, it is probable that the actual energy intakes are significantly higher than estimated in Table 4.2, particularly for the children older than 12 months. However, since the increase in the proportion of children consuming food as described by any of the above categories over rounds is small, and since the proportion of children consuming ACF is significant across most states, the estimates for ACF and quantities presented in Table 4.2 are likely to closely reflect the true magnitude of change in intake over time.

iv The question that is used for generating 24-hour EBF estimates in NFHS-3 does not include an option for medicines. By definition, medicines are considered not to be a violation of exclusive breastfeeding. Hence, the RACHNA endline survey question includes a prompted option for medicines and excludes this while defining EBF. It is possible that medicines are included in the "others" option in the NFHS-3 question, and this might result in a slight underestimation of EBF rates by NFHS-3.

v There are very large differences between NFHS-3 and RACHNA estimates in a couple of states (Madhya Pradesh and Rajasthan). In the case of Madhya Pradesh, the three project districts are clustered adjacent to Chhattisgarh, and it is likely that even baseline EBF rates were high, at levels similar to those in Chhattisgarh, while NFHS-3 estimates represent the whole state (48 districts). The reasons for the wide differences in Rajasthan are not clear, but may lie in wide variations between districts, considering that the Round 3 EBF estimates in the panel district of Rajasthan (Bikaner) are close to state NFHS-3 estimates.

vi Until the Supreme Court ruling of 2004 mandated universal provision of food supplements to all families in the geographical coverage area of an AWC, the ICDS program had followed the practice of targeting food supplements to the families of scheduled castes, scheduled tribes and other poor families. It was predicted that, since food served as an incentive for mothers and children to come to the AWC, food supplements would encourage utilization of AWC-based services such as antenatal check-ups and immunization, provided by the ANM at the AWC. Since these food-beneficiaries were specifically targeted by ICDS, it was also predictable that outreach services provided by the AWW would reach food beneficiaries more than others. What was not predicted was that outreach services of ANM of the health/RCH program, which did not by policy target ICDS food beneficiaries, would also reach food beneficiaries more selectively than other families.

vii As observed in Table 4.7, in five of the eight states, 90 percent or more mothers reported that rice/*roti*/*khichdi* were cooked at home on each of the past seven days. In Uttar Pradesh, about 13 percent reported that such cereals were not cooked daily, while in Chhattisgarh and Madhya Pradesh more than 20 percent reported this. Up to 2.4 percent reported that cereals were not cooked in the house on any of the last seven days. While this appears alarming, the gaps are unlikely to be due to lack of availability of cereals, since there is no significant difference in the socioeconomic makeup of those reporting vs those not reporting such gaps. Those not reporting daily cooking/consumption of cereals in the previous week were also not consistently those who reported gaps in food availability when asked more direct questions related to food security. The food security related questions also did not reveal acute current food unavailability (the data collection happened in February-March 2006). It could be that the question as communicated ("In the last seven days, on how many days were rice, *roti* or *khichdi* cooked in the house?") may have been interpreted narrowly to exclude certain other staples, or to include only one or the other among these three, or to exclude days on which the family was not at home, or days when the family for other reasons did not cook at home. For the purpose of this analysis, it should be safe to assume that the actual availability of cereals was close to 100 percent. In reality, a certain proportion of families do go through seasonal lean periods when sufficient food is not available at home, for periods ranging from a few days up to two months in a year. A much smaller proportion report experiencing extreme deprivation for brief periods, when there may be literally no grain at home. When asked specifically whether children under five years have to eat less during lean periods, less than one percent of families admitted to this. These findings were echoed by a number of groups working with poor communities on livelihood related issues in different parts of the country. These findings, based on the INHP-II endline survey, have not yet been published.

(Contd. from inside of the front cover)

proportion of households reported non-availability for varying periods in 7-day recalls. In addition, significant gaps were found in the utilization of food items such as vegetables and milk, despite availability at home.

In many states and districts, significantly strong associations were found between reported processes promoted by INHP, such as timely home contacts or advice given by service providers and feeding practices, suggesting that the processes had contributed to improvements in feeding practices at large scale.

Despite the improvements in feeding practices, the absolute amounts of cereal-based complementary foods reported in 24-hour recalls were much lower than recommended levels even at or close to the project endline. This appears to be one of the main reasons for the lack of change in nutritional status found in the evaluation research study.

The INHP experience indicates that infant and young child feeding practices can change at large scale, and change relatively quickly and measurably. Evidence is presented to suggest that there was wide variation in the rate of improvement in feeding practices across districts, and that, where substantial improvements in feeding practices were achieved, reductions in malnutrition rates were probably also achieved, as demonstrated by evidence from one district in Orissa. Taken together, the paper suggests that the ICDS and Health Department programs, which were the primary implementers, can make a substantial difference to infant and young child feeding practices and to nutritional status, using strategies that bring their efforts to focus on critical feeding issues.

This series of working papers was envisioned and written by persons actively involved in the program design and implementation. USAID/BASICS directly contributed to the writing and production of this series of papers in several ways before it closed in India in December 2007. A number of data support and field staff gave invaluable contributions, and the papers were reviewed by CARE-India and USAID/India staff.

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About RACHNA

Two major projects of the Reproductive and Child Health, Nutrition and HIV/AIDS (RACHNA) program of CARE-India completed five years of work supported by funds from USAID in late 2006. The second phase of Integrated Nutrition and Health Project (INHP-II) was aimed at helping reduce child malnutrition and mortality. The rural component of the *Chayan* project primarily addressed the unmet need for spacing methods, while its urban component attempted to reduce HIV transmission among at-risk groups. Together, the projects covered 78 districts and 22 cities, spread over 10 states, and worked closely with key national programs and a spectrum of different partners. This series of working papers documents the results and lessons from these five years.

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